Vol. 885 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT OFFICE

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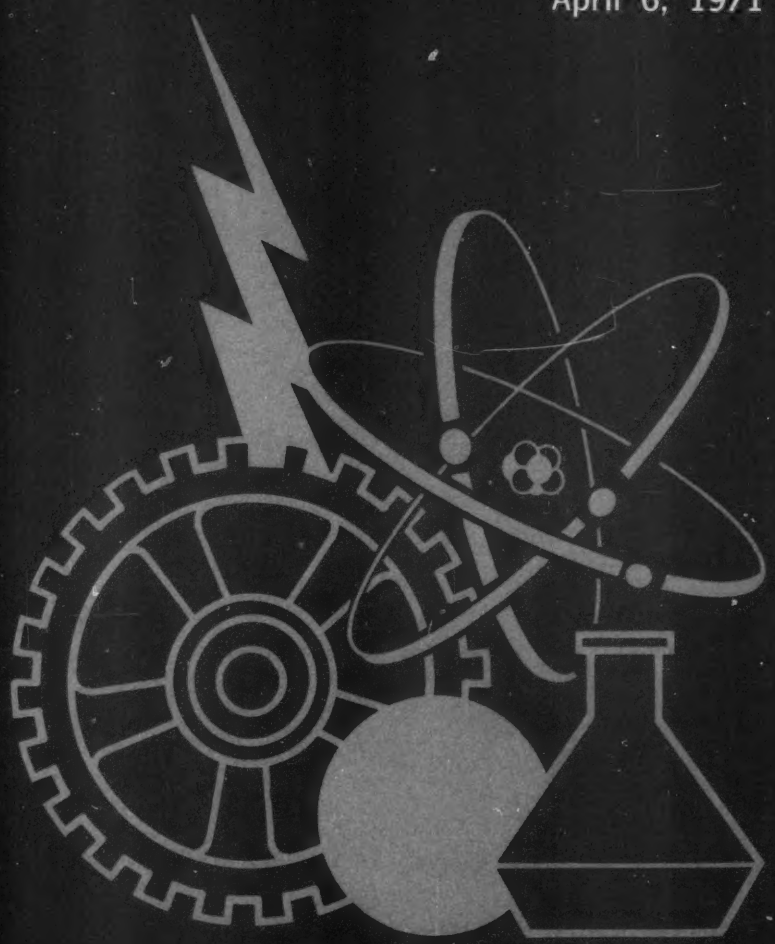
PATENTS

April 6, 1971



U. S. DEPARTMENT OF COMMERCE

Patent Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT OFFICE

April 6, 1971 Volume 885 Number 1

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PATENT OFFICE NOTICES

Identification for Application Correspondence

The Office is continuing to experience difficulty in matching incoming papers with the corresponding application files. This applies especially to responses to Office Actions, powers of attorney, changes of address, status letters, requests for extensions of time, and petitions.

A very necessary part of a complete identification of a pending application is the three-digit Group or Art Unit number, e.g., 110 or 111. Frequently, the Group Art Unit number is entirely omitted, or there are errors in this number. In the latter situation the error often occurs as a result of the case having been reassigned within the Office, and the communication is directed to an Examining Group other than that indicated in the most recent Office Action.

Where the Group Art Unit number is entirely omitted, the routine operations of the Application Branch must be interrupted solely for the purpose of determining the location of the application so that the communication can be properly routed. Under these circumstances the efficiency of the Application Branch is impaired and the incoming paper is delayed in reaching its proper destination. Where such papers are not essential to compliance with a statutory period or time limit for response, they may be returned for completion to identify the location of the files.

To assist the Office in expediting its business, it is requested that ALL papers relating to a pending application include the following information:

1. Serial number (checked for accuracy),
2. Group Art Unit number (copied from filing receipt or most recent Office Action),
3. Filing date,
4. Name of the Examiner who prepared the most recent Office Action,
5. Title of the invention.

To further reduce the burden on the Application Branch and the Examining Groups, it is also requested that the submission of additional or supplemental papers on a newly filed application be deferred until a filing receipt has been received. In the same vein, it would be appreciated if the filing of additional papers relating to an allowed application were referred until a notice of allowance (POL–85) was received.

If the above suggestions are adopted the processing of both new and allowed applications could proceed more efficiently and promptly through the Patent Office.

RICHARD A. WAHL,
Mar. 5, 1971. *Assistant Commissioner.*

Patent Suits

Notices under 35 U.S.C. 290; Patent Act of 1952

2,685,954, T. H. Curtis, PROCESSING MACHINES; **2,709,512,** same, **filed** Apr. 6, 1970, D.C. N.D. Ill. (Chicago), Doc. 70c793, *M & T Chemicals, Inc.* v. *Kewanee Oil Co.* Cause stricken from the calendar without prejudice, Oct. 29, 1970.

2,695,190, E. Meierjohan, ARTICLE TRANSFERRING APPARATUS; **2,873,996,** C. J. McHugh, LIFTING CUP FOR ARTICLE TRANSFERRING APPARATUS, **filed** Nov. 15, 1967, D.C., S.D. Tex. (Houston), Doc. 67–H–869, *The Lodge & Shipley Company* v. *Holstein & Kappert G.m.b.H. and Wolfgang Backhaus.* Claim 12 of Patent No. 2,695,190 invalid and not infringed. Claim 8 of Patent No. 2,873,996 invalid and not infringed. Action dismissed with prejudice, Oct. 26, 1970.

2,708,376, C. H. Booth, CUTTING AND ABRADING TOOLS, **filed** Nov. 6, 1970, D.C. S.D.N.Y., Doc. 70–C–4873, *The Stanley Works* v. *Wim Distributors.*

2,709,512. (See 2,685,954.)

2,801,510, R. R. Colburn, TRACTOR MOUNTED ROTARY DISC MOWER; **2,869,304,** same, COMBINED TRACTOR AND POWER MOWER, **filed** Nov. 20, 1970, D.C., E.D. Wis. (Milwaukee), Doc. 70–C–658, *E. L. Colburn and R. R. Colburn* v. *Simplicity Manufacturing Co. Inc.*

2,843,012, Butterworth and Morse, PHONOGRAPH PERFORMANCE ILLUSTRATOR, **filed** Nov. 18, 1970, D.C. Md. (Baltimore), Doc. 70–1308–K–C, *Herbert Wallace Butterworth* v. *General Electric Company et al.*

2,873,996. (See 2,695,190.)

2,869,304. (See 2,801,510.)

2,923,144, T. R. Smith, FLUID CONTROL SYSTEM FOR WASHING MACHINE, **filed** Nov. 30, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c2990, *The Maytag Co., etc.* v. *General Motors Corp., etc.*

2,945,582, Abraham and Metzger, BOWLING BALL CARRYING CASE, **filed** Nov. 20, 1970, D.C., N.D. Ill. (Chicago), Doc. 70c2923, *Triangle Leather Goods Company* v. *Paul Abraham and Roman Metzger.*

2,994,237, H. Pelphrey, deceased, by Lillian Pelphrey, administratrix, TOOTH FORMING TOOL; **3,015,243,** J. C. Drader, TOOL FOR PRESSURE FORMING TOOTHED ELEMENTS, **filed** Nov. 27, 1970, D.C. E.D. Mich. (Detroit), Doc. 35711, *Michigan Tool Co.* v. *Techtool, Inc.* **Same, filed** Nov. 27, 1970, D.C., E.D. Mich. (Detroit), Doc. 35712, *Michigan Tool Co.* v. *Rendall Tool Co.; Rendall Tool & Gage Co.*

3,015,243. (See 2,994,237.)

3,018,272, Griffing and Remington, SULFONATE CONTAINING POLYESTERS DYEABLE WITH BASIC DYES, **filed** Nov. 12, 1970, D.C., S.D.N.Y., Doc. 70–C–4978, *E. I. du Pont de Nemours & Co.* v. *Eastman Chemical Products, Inc.*

3,021,871, F. J. Rodgers, HOSE FOR PORTABLE PNEUMATIC EQUIPMENT, **filed** Nov. 25, 1970, D.C., E.D. Wis. (Milwaukee), Doc. 70–C–663, *Samuel Moore & Company* v. *Imperial-Eastman Corporation.*

3,105,713, F. J. Hassler, APPARATUS FOR BULK CURING TOBACCO; **3,110,326,** same, METHOD FOR BULK CURING TOBACCO, **filed** May 15 1964, D.C., E.D.N.C. (Raleigh), Doc. 876–C, *Powell Manufacturing Co., Inc. and R. H. Bouligny, Inc.* v. *Long Manufacturing Company.* Ordered plaintiffs' claim for relief denied. Patent claims are declared invalid and void, Nov. 18, 1970.

3,110,326. (See 3,105,713.)

3,155,814, Appleman and Eck, INFRARED RADIANT HEATING OVEN, **filed** Nov. 10, 1970, D.C., S.D.N.Y., Doc. 70–C–4916, *Alfon A. Wolz and Radiant Oven Corp.* v. *Litton Industries, Inc.*

3,184,314, Forest and Czarnetzky, METHOD FOR THE PRESERVATION OF SILAGE, **filed** Nov. 3, 1970, D.C., N.D., Iowa (Fort Dodge), Doc. 70–C–2039–C, *International Stock Food Corporation* v. *M & M Livestock Products Co.*

3,188,468, L. E. Packard, METHOD AND APPARATUS FOR AUTOMATIC STANDARDIZATION IN LIQUID SCINTILLATION SPECTROMETRY, **filed** June 8, 1970, D.C. Conn. (New Haven), Doc. 13884, *Packard Instrument Company, Inc.* v. *Picker Corporation et al.* Stipulation final judgment, plaintiff owner of patent, defendant infringed and enjoined, Nov. 28, 1970.

3,201,960, I. L. Berkowitz, COMBINATION MAGNETIC AND MECHANICAL LATCH, **filed** May 21, 1969, D.C., E.D.N.Y. (Brooklyn), Doc. 69–C–546, *Kason Hardware Corp.* v. *Instrument Systems Corp.* Consent judgment for injunction, Nov. 23, 1970.

3,254,845, P. W. Schlosser, FLUID POWER TRANSFER APPARATUS; **3,367,270,** same, **filed** Feb. 6, 1967, D.C., N.D. Ill. (Chicago), Doc. 67c201, *Panther Pumps & Equipment Company, Inc.* v. *Hydrocraft, Inc. et al.* Final judgment, permanent injunction against defendants, Nov. 24, 1970.

3,267,587, Niemiec and Satterlee, HAIR DRYER, **filed** Feb. 10, 1970, D.C. Minn. (St. Paul), Doc. 3–70–C–28, *Sunbeam Corporation* v. *Faberge, Inc.* Defendant owner of patent; plaintiff has infringed; complaint dismissed with prejudice, Nov. 27, 1970.

3,285,752, Hansen, Schwall and Colburn, METHOD OF PREPARING A POULTRY PRODUCT, **filed** Oct. 23, 1967, D.C., N.D. Ill. (Chicago), Doc. 67c1829, *Armour and Company* v. *Swift and Company.* Judgment, order, claims of patent invalid; defendant has not infringed, Nov. 27, 1970.

3,302,731, J. W. Perry, POST DRIVING AND COMPACTING MACHINE; **3,335,804,** same, POST DRIVING MACHINE, **filed** Nov. 24, 1970, D.C. Ariz. (Phoenix), Doc. C–70–645 Phx., *Goertl Bros., Metal Products, Inc.* v. *James W. Perry et ux.*

3,335,804. (See 3,302,731.)

3,367,270. (See 3,254,845.)

3,371,828, N. E. Elsas, TURNING APPARATUS, **filed** Nov. 13, 1970, D.C., E.D.N.Y. (Brooklyn), Doc. 70–C–1406, *Xemo Industries, Inc., Sunbrand Corporation* v. *L.I.F. Machine Company, Inc.*

3,376,752, E. E. Malone, GRAVEL SAMPLING MACHINE, **filed** Nov. 16, 1970, D.C. Idaho (Boise), *Eugene E. Malone* v. *Twin Falls Construction Co. et al.*

3,433,939, M. F. Lothman, DECORATIVE NIGHT LIGHT, **filed** Oct. 21, 1970, D.C., C.D. Calif. (Los Angeles), Doc. 70–2387–CC, *Kenneth A. Sieloff et al.* v. *Hillcrest Manufacturing Company, Inc. et al.*

3,436,787, W. H. Wisdom, STEAM AND VACUUM NOZZLE; **3,439,374,** same, **filed** Nov. 27, 1970, D.C. Nev. (Las Vegas), Doc. C–LV–1531, *Steamatic, Inc.* v. *Joe D. Evans and Penny D. Evans, doing business as Steamatic of Las Vegas et al.*

3,439,374. (See 3,436,787.)

3,494,333, R. P. Mommer, ANIMAL INSECTICIDE DUST DISPENSER BAG, **filed** Nov. 6, 1970, D.C. Conn. (New Haven), Doc. B–212, *Balcom Chemicals, Inc.* v. *Arkell Safety Bag Co., Inc., Chase Bag Company, Inc.*

3,538,389, Levesque and Harper, SUBELEMENT FOR ELECTRONIC CIRCUIT BOARD, **filed** Nov. 3, 1970, D.C., C.D. Calif. (Los Angeles), Doc. 70–2470–CC, *Circuit-Stik, Inc.* v. *Bishop Graphics, Inc. et al.*

D. 219,118, Baker and Plecia, BOAT, **filed** Nov. 20, 1970, D.C., N.D. Calif. (San Francisco), Doc. C70–2504 RFP, *Sidewinder Marine, Inc.* v. *Bruce Nescher and Sleekcraft Boats, Inc.*

Certificates of Correction for the Week of Apr. 6, 1971

D. 217,941	3,530,612	3,536,303	3,547,985
D. 219,280	3,531,252	3,536,535	3,548,217
3,219,666	3,531,463	3,536,712	3,548,377
3,245,329	3,531,518	3,536,757	3,548,854
3,306,800	3,531,537	3,538,252	3,549,070
3,431,656	3,531,822	3,538,254	3,549,384
3,478,465	3,532,234	3,538,503	3,549,575
3,489,103	3,532,264	3,539,369	3,549,686
3,489,351	3,532,349	3,539,403	3,549,687
3,491,420	3,533,096	3,539,684	3,549,799
3,493,897	3,533,217	3,539,861	3,549,885
3,495,239	3,533,788	3,540,346	3,550,788
3,499,749	3,533,792	3,541,037	3,551,375
3,508,251	3,533,821	3,541,760	3,551,749
3,509,302	3,533,864	3,541,872	3,552,325
3,511,472	3,533,928	3,542,860	3,552,540
3,511,804	3,533,958	3,542,903	3,552,579
3,514,576	3,534,147	3,542,919	3,552,818
3,516,002	3,534,179	3,543,752	3,552,953
3,519,453	3,534,253	3,543,889	3,552,974
3,519,946	3,534,257	3,544,391	3,553,140
3,520,047	3,534,270	3,545,648	3,553,644
3,520,830	3,534,295	3,545,907	3,554,075
3,526,690	3,534,369	3,546,133	3,554,179
3,526,722	3,534,504	3,546,298	3,554,267
3,527,267	3,534,936	3,546,335	3,555,010
3,527,425	3,535,276	3,546,510	3,555,189
3,527,935	3,535,280	3,546,711	3,555,249
3,528,348	3,535,469	3,546,716	3,555,383
3,528,488	3,535,490	3,546,974	3,559,215
3,528,784	3,535,633	3,547,322	
3,528,926	3,535,647	3,547,587	
3,529,672	3,536,030	3,547,908	

Early Notification of Serial Number

To ensure prompt notification of the receipt of newly filed application papers, self-addressed post cards will be date stamped and promptly returned to the sender by the Correspondence and Mail Division.

If early notification of the *serial number* is also desired, an additional self-addressed post card should be submitted. Upon receipt of application papers with two return post cards, Correspondence and Mail Division will stamp both cards with the receipt date and return one card to the sender. The second card will be forwarded to the Application Branch where both the card and application papers will be stamped with a serial number and the card returned to the sender.

The identifying data on the post card intended for evidence that the Patent Office has received a complete set of application papers should include applicant's name(s); title of the invention; number of pages of specification, claims, and sheets of drawing; whether oath or declaration used; and amount and manner of paying the fee.

When more than one set of application papers is filed under one cover, a return post card should be attached to each set of papers for which a receipt is desired.

RICHARD A. WAHL,
Assistant Commissioner.

Mar. 10, 1971.

Republication of Marks Published for Opposition in the Official Gazettes (Trademark Section) of February 2, 9, 16, and 23 and March 2, 9, and 16, 1971

Since it appears that a substantial portion of the interested public did not receive copies of the OFFICIAL GAZETTE (Trademark Section) for the issues of February 2, 9, 16, and 23 and March 2, 9, and 16, 1971, in sufficient time to consider the filing of oppositions, all marks published for opposition in those issues are hereby declared to be republished as of March 23, 1971, pursuant to Section 12(a) of the Trademark Act of 1946, as amended. Opposition to those marks may be filed within the time after March 23, 1971, specified in Section 13 of the Statute or by Rules 2.101 and 2.102 of the Trademark Rules of Practice. Any oppositions to these marks received prior to this republication will be considered to have been timely filed.

WILLIAM E. SCHUYLER, JR.,
Commissioner of Patents.

Feb. 25, 1971.

PATENT EXAMINING CORPS

R. A. WAHL, Assistant Commissioner
F. H. BRONAUGH, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF MARCH 23, 1971

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—M. STERMAN, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	10-13-69
GENERAL ORGANIC CHEMISTRY, GROUP 120—I. MARCUS, Director. Heterocyclic; Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	4-30-69
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—L. J. BERCOVITZ, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	1-08-70
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—A. P. KENT, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	12-02-69
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—W. B. KNIGHT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	7-22-69
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS AND RELATED ELEMENTS, GROUP 210—N. ANSHER, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Miscellaneous.	6-18-70
SECURITY, GROUP 220—R. L. CAMPBELL, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	7-09-69
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	1-02-70
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—W. L. CARLSON, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	2-06-70
PHYSICS, GROUP 280—R. L. EVANS, Director. Photography; Sound and Lighting; Indicators and Optics; Measuring and Testing; Geometrical Instruments.	12-23-70
DESIGNS, GROUP 290—R. L. CAMPBELL, Director. Industrial Arts; Household, Personal and Fine Arts.	5-21-70
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—A. BERLIN, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Railways and Railway Equipment; Brakes; Rigid Flexible and Special Receptacles and Packages.	12-22-69
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—D. J. STOCKING, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus; Plastics Working Apparatus; Plastic Block and Earthenware Apparatus; Machine Tools for Shaping or Dividing; Work and Tool Holders Woodworking; Tools; Cutlery; Jacks.	12-01-69
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—A. RUEGG, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	11-14-69
HEAT, POWER AND FLUID ENGINEERING, GROUP 340—C. F. GAREAU, Director. Power Plants; Combustion Engines; Fluid Motors; Pumps; Turbines; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Vaporizing; Temperature and Humidity Regulation; Machine Elements; Power Transmission; Fluid Handling; Lubrication; Joint Packing.	4-06-70
CONSTRUCTIONS, SUPPORTS, TEXTILES, CLEANING, GROUP 350—T. J. HICKEY, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Receptacles; Supports; Cabinet Structures; Centrifugal Separations; Cleaning; Coating; Pressing; Agitating; Foods; Textiles; Apparel and Shoes; Sewing Machines; Winding and Reeling.	1-06-70

Expiration of patents: The patents within the range of numbers indicated below expire during April 1971, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,673,978 to 2,677,128, inclusive
Plant Patents..... Numbers 1,267 to 1,273, inclusive

REISSUES

APRIL 6, 1971

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

27,112
PHOTOGRAPHIC METHOD

Robert B. Eaves, Wayne, Pa., assignor to Photo Motion Corporation, Norristown, Pa.

Original No. 3,295,915, dated Jan. 3, 1967, Ser. No. 251,602, Jan. 15, 1963. Application for reissue Dec. 5, 1968, Ser. No. 786,499

Int. Cl. G03c *5/04*

U.S. Cl. 96—27 5 Claims

Apparatus and method for photographic animation in which a multi-axis polarizing screen is provided with multiple images. Illumination through a selectively changing polarizing medium recreates the images in a selected manner to create the illusion of motion.

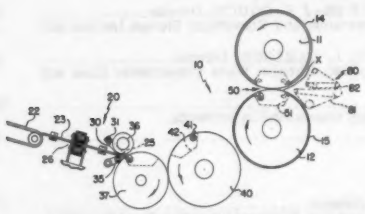
27,113
SHEET MATERIAL FORMING APPARATUS

Albert J. Sarka, Fairview Park, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio

Original No. 3,383,991, dated May 21, 1968, Ser. No. 512,576, Dec. 6, 1965. Application for reissue Feb. 19, 1970, Ser. No. 12,873

Int. Cl. B31b *1/14*

U.S. Cl. 93—58.2 25 Claims



A pair of rotary cylinders define a material forming nip. The rotary cylinders have complementary die plates mounted thereon. The die plates have projecting means thereon which cooperate to simultaneously cut and crease sheet material as it is advanced therebetween. Means is provided for conveying and introducing the sheet material in a registered condition into the deforming nip, and feeding members are provided on the die plates to assist in advancing the sheet material through the nip and maintain the sheets in their registered condition

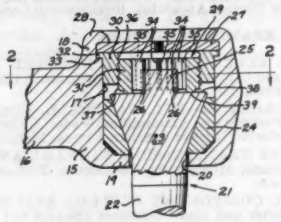
27,114
SELF-ADJUSTING MOVABLE JOINT DEVICE

William A. Scheublein, Jr., Ballwin, and Louis P. Fister, St. Louis, Mo., assignors to Moog Industries, Inc., St. Louis, Mo.

Original No. 3,401,966, dated Sept. 17, 1968, Ser. No. 560,334, June 24, 1966. Application for reissue May 20, 1969, Ser. No. 830,904

Int. Cl. F16c *11/00*

U.S. Cl. 287—93 9 Claims



A self adjusting wear compensating movable joint device having relatively rotatable movable housing and stud components, with the stud head operatively mounted in the housing and secured on its bearing seat by wear take-up adjusting means which is rendered operative upon relative rotation in one direction between the housing and the stud to take-up looseness of the stud head on its bearing and to become inoperative when the relative rotation between the stud and the housing might tend to undo the wear take-up, or when the wear take-up has been completed so as not to overload or strain the working components.

PLANT PATENTS

GRANTED APRIL 6, 1971

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,037
ROSE PLANT

Patrick Dickson, Newtownards, Ireland, assignor to Jackson & Perkins Company, Newark, N.Y.

Filed May 2, 1969, Ser. No. 821,514

Int. Cl. A01h *5/00*

U.S. Cl. Plt.—20 **1 Claim**

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of a vigorous, upright and well-branched plant habit, an abundance of dark green, glossy foliage which is relatively resistant to blackspot and powdery mildew, large, double flowers having from 60 to 70 petals and which open to a high-centered flower form, and a distinctive and attractive light red general color tonality of the flowers, with the color being lighter in shade on the reverse sides of the petals than on their upper sides.

3,038
BARBERRY SHRUB

Hendrik den Ouden and Frits den Ouden, Boskoop, Netherlands, assignors to Monrovia Nursery Company, Azusa, Calif.

Filed Feb. 17, 1969, Ser. No. 800,010

Int. Cl. A01h *5/00*

U.S. Cl. Plt.—58 **1 Claim**

1. A new and distinct variety of genus Berberis shrub, substantially as shown and described, characterized by a combination of features not found combined in prevously known members of the genus, these features being compact globular branching, foliage of a green color as described, and a leaf structure and shape unusual in Berberis.

3,039
CHRYSANTHEMUM

Steven J. Borsh, North Hollywood, Calif. (4547½ Auhay Drive, Santa Barbara, Calif. 93105)

Filed Jan. 3, 1969, Ser. No. 788,968

Int. Cl. A01h *5/00*

U.S. Cl. Plt.—78 **1 Claim**

1. A new variety of chrysanthemum plant substantially as shown and described, characterized by a peony-form blossom and compact growth.

PATENTS

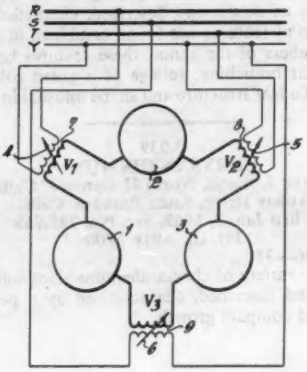
APRIL 6, 1971

ELECTRICAL

3,573,336
METHOD AND A CONTROL DEVICE FOR OPERATING A POLYPHASE ELECTRIC FURNACE

Werner Ibach, and Georg Herget, Knapsack near Cologne, Germany, assignors to Knapsack Aktiengesellschaft, Knapsack bei Cologne, Germany

Filed May 29, 1969, Ser. No. 829,036
Claims priority, application Germany, May 31, 1968, P 17 65 514.0
Int. Cl. F27d *11/10*
U.S. Cl. 13—12 3 Claims



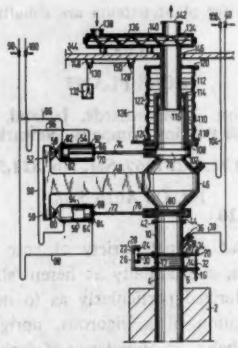
A control device for operating a three phase electric reduction furnace includes a two-point controller responding to departures of the furnace power actual values from the furnace power nominal values for obtaining from an integral controller variations of the electrode current nominal values. Other two-point controllers compare the varied electrode current nominal values with the electrode current actual values and respond to departures of the varied electrode current nominal values from the electrode current actual values to provide adjustment signals for the output controls for corresponding phases of the furnace transformer. Differential controllers sense the differences between the actual currents flowing through the said electrode and the electrodes disposed nearest thereto on the two sides of it, and additional differential controllers activate the transformer output control drive in response to the adjustment signals for adjusting the furnace transformer phase which lies between the two electrodes having the least sensed current difference.

3,573,337
FEEDING ARRANGEMENT FOR AN ELECTRIC FURNACE HAVING A TUBULAR ELECTRODE

Ludwig Grimm; Otto Kick, Hart/Alz, and Siegfried Starke, Garching, Germany, assignors to Suddeutsche Kalkstickstoffwerke Aktiengesellschaft, Trostberg, Germany

Filed Oct. 8, 1969, Ser. No. 864,768
Int. Cl. F27d *3/00, 3/14*
U.S. Cl. 13—33 12 Claims

In an electric furnace in which particulate solid material is fed to the furnace hearth from a normally stationary feed pipe through an axially expandable and contractable conduit and through the bore of the electrode, a charging chamber is mounted between the conduit and the electrode and provided with slide valves in its feeding and discharge portions respectively. Suitable operation of the valves

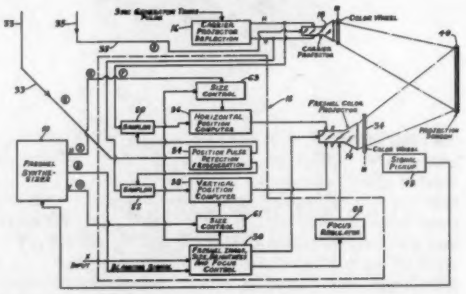


permits the material to be introduced into the furnace without release of significant amounts of furnace gases.

3,573,338
FRESNEL IMAGE COMPUTER

Dorsey Davidoff, Fort Lee, N.J., assignor to the United States of America as represented by the Secretary of the Navy

Filed Aug. 13, 1965, Ser. No. 479,674
Int. Cl. G09b *9/08*
U.S. Cl. 35—10.2 3 Claims



A TV projection system for simulating on a common projector screen the appearance of an aircraft landing area and an associated Fresnel-type visual landing aid through the use of a TV projector for the landing area image and a beam writing projector for the landing aid image, the system utilizing a flying spot scanner TV image method and containing a transparency representative of the landing area and having a reflective pointer positioned in such a way with respect to the flying spot scanner horizontal and vertical sweep directions so that the point of the pointer is first touched by the flying spot in each frame, an optical pickup above the transparency to pick up reflected video from the arrow so that the first video pulse per frame represents the beam writing pattern center position on the flying spot scanner as well as on the TV projector, a sampling system to sample the TV yoke currents at the first video pulse, and two DC stabilized operational amplifiers, which may include yoke driver output stages, connected in such a way as to produce the desired beam writing pattern in the beam writing projector, properly positioned with respect to the TV

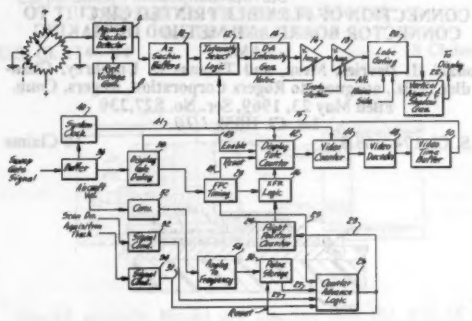
projector, when both images are projected on the common screen.

3,573,339

DIGITAL ELECTRONIC GROUND RETURN SIMULATOR

Robert D. Flower, Stow, and William A. Hinkle, Akron, Ohio, assignors to the United States of America as represented by the Secretary of the Navy

Filed July 24, 1969, Ser. No. 844,430
Int. Cl. G09b 9/00
U.S. Cl. 35—10.4 5 Claims



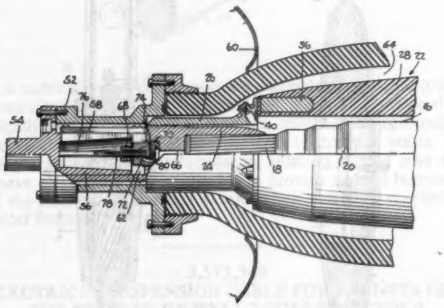
A radar simulator training device for training radar operators which utilizes the output of an antenna azimuth scan detector to select one of a plurality of stored programs of an azimuth sector of terrain. The selected program controls the gain of a variable gain amplifier in order to vary the ground return noise generator input to the amplifier. The output of the amplifier is then applied to the training display through various other circuitry.

3,573,340

SEALED FLUID CABLE END WITH RELEASABLE VALVE PARTICULARLY FOR TERMINAL DEVICES DISPOSED IN NON-ACCESSIBLE AMBIENTS AND METHOD OF INSTALLING SAME

Nicola Palmieri, and Vittorio Buroni, Milan, Italy, assignors to Pirelli Societa per Azioni, Milan, Italy

Filed Jan. 30, 1969, Ser. No. 795,287
Claims priority, application Italy, Jan. 10, 1968, 12,639A/68
Int. Cl. H02g 15/22
U.S. Cl. 174—20 20 Claims



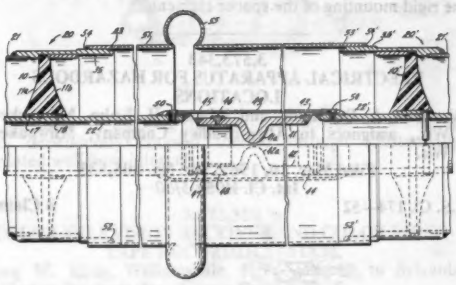
Oil-filled cable end and end terminal device therefor for entry into an accessory or apparatus of the closed type; means are provided enclosing cable end for preventing oil leakage from exposed insulation; means are also provided covering the oil duct in the cable end for normally preventing fluid flow therefrom, and for allowing fluid flow when the end terminal device is completely positioned within the accessory or apparatus of the closed type.

3,573,341

COMPRESSED-GAS INSULATED ELECTRICAL CONDUCTORS EMPLOYING EXPANDED TUBING COVER DESIGN

Howard W. Graybill, and Roy H. Albright, Greensburg, Pa., assignors to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed Mar. 24, 1969, Ser. No. 809,889
Int. Cl. H01b 9/06; H02g 15/24
U.S. Cl. 174—22 11 Claims



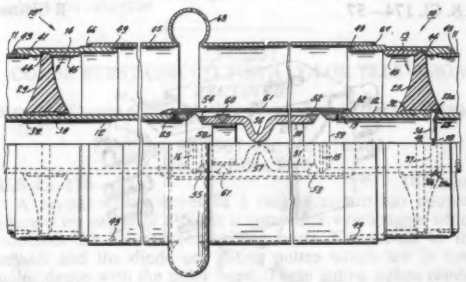
A compressed insulated conductor system comprised of a substantially cylindrical-shaped metallic enclosure and a substantially cylindrical-shaped conductor positioned within the enclosure and held concentric therewith by means of annular-shaped insulating spacers arranged at spaced intervals within and along the interior of the enclosure. The enclosure is filled with a compressed gas such as, for example, SF_6. The spacers at opposite ends of each bus section are fixedly secured to the enclosure in such a manner as to seal the compressed gas within the interior of the enclosure. The enclosure at opposite ends thereof is so formed as to provide a bearing surface for one marginal edge of an end spacer, the opposite end of which is rigidly held in place by means of a duct cover end firmly secured within the enclosure and bearing against the second marginal surface of the end spacer. The spacer is provided with an annular-shaped groove around its exterior surface, which hollow space defined by the groove and the enclosure interior abutting thereagainst is filled with an epoxy material to firmly secure the spacer to the enclosure and to prevent any gaps between the adjacent surfaces of enclosure and end spacer, as well as preventing the escape of the compressed gas contained within the enclosure.

3,573,342

COMPRESSED-GAS-INSULATED HIGH VOLTAGE ELECTRICAL CONDUCTOR UTILIZING PREASSEMBLED LENGTHS JOINED BY FIELD-WELDED EXPANSION JOINTS

Howard W. Graybill, and Roy H. Albright, Greensburg, Pa., assignors to I-T-E Imperial Corporation, Philadelphia, Pa.

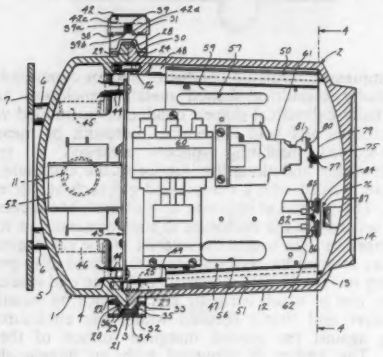
Filed Apr. 1, 1969, Ser. No. 812,016
Int. Cl. H01b 9/06; H02g 15/24
U.S. Cl. 174—22 18 Claims



A metal-enclosed high-voltage rating electrical conductor assembly of unitary design. Similar sections of such assembl-

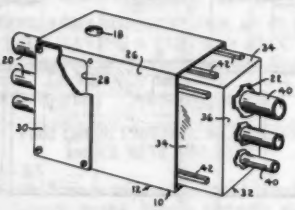
ies are positioned end-to-end to form a bus run and are jointed together by yieldable duct cover assemblies and conductive connectors. Insulating spacers arranged at spaced intervals along each section are permanently secured within each section and arranged to prevent any egress of compressed gas confined to a section either during shipment upon installation or thereafter. The joining of adjacent sections may therefore be carried out without any concern being given to disturbing the compressed gas contained within each section or without any concern being given to the rigid mounting of the spacer elements.

3,573,343
ELECTRICAL APPARATUS FOR HAZARDOUS LOCATIONS
Woodrow A. De Smidt, and Edward H. Kuhn, Milwaukee, Wis., assignors to Allen-Bradley Company, Milwaukee, Wis.
Filed Mar. 10, 1969, Ser. No. 805,535
Int. Cl. H05k *5/00*
U.S. Cl. 174—52 **8 Claims**



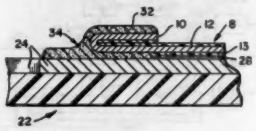
An electrical apparatus enclosure made up of a base adapted for mounting on a panel and a cover to be assembled on the base portion. The base and cover flanges about the open ends are clamped together by a clamping ring. A transverse mounting plate is bolted inside the base and longitudinal mounting plate projects from the center of the transverse mounting plate to support electrical apparatus inside the cover. Control handles are mounted on the outer end of the cover to move actuators inside the cover, which operate the enclosed apparatus. Conduit ports are formed in the base.

3,573,344
TELESCOPICALLY ADJUSTABLE JUNCTION BOX
Robert C. Snyder, 202 Tomahawk Trail, Pottawattamie Park, La Porte, Ind.
Filed Feb. 2, 1970, Ser. No. 007,548
Int. Cl. H02g *3/10*
U.S. Cl. 174—57 **8 Claims**



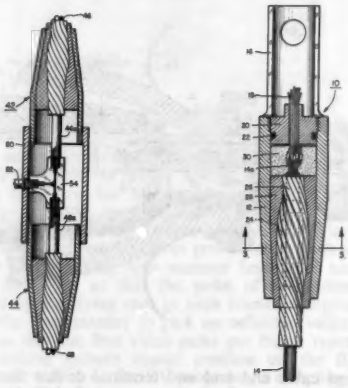
A telescopically adjustable junction box for installation in conduit runs which expands and contracts with the support structure at the expansion joints thereof. This box comprises an open end insert box telescopically movable in the open end of a cover box. Runners are provided on the exterior of the insert box for riding on the inside face of the cover box sides. Conduit holes are provided in the closed ends of the cover and insert boxes for inserting and connecting thereto the ends of the conduits. The electric wires span the space between the conduit pipe ends with sufficient slack for expansion takeup. The enlarged interior capacity provided in the boxes allows lateral wire movement during contraction, manual handling of the wires for pull through operation, and splice connections for tapping and distribution.

3,573,345
CONNECTION OF FLEXIBLE PRINTED CIRCUIT TO CONNECTOR BOARD AND METHOD OF MAKING SAME
Donald H. Devries, Mesa, and Thomas D. Umphrey, Chandler, Ariz., assignors to Rogers Corporation, Rogers, Conn.
Filed May 23, 1969, Ser. No. 827,230
Int. Cl. H05k *1/10*
U.S. Cl. 174—68.5 **10 Claims**



A terminated multiconductor flat flexible printed circuit cable and its production are disclosed. The insulation is stripped from one side of one end of the cable to expose portions of the conductors, the cable is folded back on itself intermediate the exposed conductor portions, the cable is adhesively bonded to a connector board with the exposed conductors in registration with the connector terminations and the folded conductor portions are passed through a wave of solder.

3,573,346
STRAIN RELIEF COUPLING
Harry A. Appleby, Cleveland, Ohio, assignor to Preformed Line Products Company, Cleveland, Ohio
Filed July 24, 1969, Ser. No. 844,394
Int. Cl. H02g *15/02, 15/08;* **F16g** *11/00*
U.S. Cl. 174—71 **14 Claims**



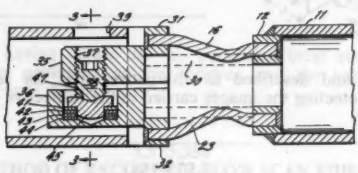
A strain relief coupling for a cable or the like comprises a housing having an elongated, tapered passageway extending therethrough. Means are adapted to be fixedly secured to the cable for defining a protuberance thereon of a diameter

intermediate that of the opposed ends of the housing passageway. The cable and its associated protuberance means are slidably received within the housing with the protuberance means securely seating against the tapered sidewalls of the housing passageway thereby to provide an effective securance of the cable to the housing. Other features and embodiments are disclosed.

3,573,347
INTERNAL PRESSURE JOINT FOR HIGH VOLTAGE TUBULAR BUS

Otto Jensen, Plymouth, Bahamas, assignor to ITE Imperial Corporation, Philadelphia, Pa.

Filed Sept. 10, 1969, Ser. No. 856,769
Int. Cl. H02g *15/08*
U.S. Cl. 174—94 **8 Claims**

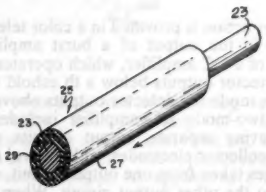


Spaced pressure blocks are inserted into the end of a hollow cylindrical bus. A jackscrew, operated through an opening in the wall of the bus, presses the blocks away from one another and into the walls of the bus. The pressure blocks are connected to a prewelded disk which has flexible conductors extending therefrom.

3,573,348
NEUTRALLY BUOYANT VERTICAL UNDERWATER CABLE

Edward M. Herrmann, 105 Round Bay Road, Severna Park, Md.

Filed Apr. 25, 1969, Ser. No. 819,298
Int. Cl. H01b *7/12*
U.S. Cl. 174—101.5 **7 Claims**



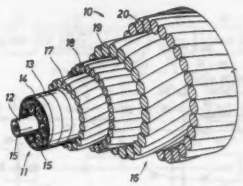
A cable for vertical suspension underwater and essentially neutrally buoyant at all depths has a core of material of slightly less specific gravity than the water and a surrounding sleeve element of higher specific gravity than the water, the weight and/or the water/displacing relation of said core and sleeve elements being adjustable to provide neutral buoyancy of the cable at its various depths when vertically suspended under force of a weight.

3,573,349
ELECTRICAL SUSPENSION CABLE FOR FACILITATING THE DESCENT OF WELL TOOLS SUSPENDED THEREFROM THROUGH DEVIATED WELL BORES

William E. Bowers, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y.

Filed May 2, 1969, Ser. No. 821,186
Int. Cl. H01b *7/22*
U.S. Cl. 174—108 **20 Claims**

As one embodiment of the new and improved electrical logging cable disclosed herein, the cable is uniquely constructed to withstand limited axial compressive loading without undue lateral bending. In this manner, by selectively moving the suspension cable downwardly from the surface, corresponding axial forces are developed in the lower portion

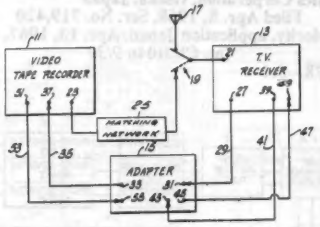


of the cable for assisting the continued descent of a logging tool dependently coupled thereto through substantially deviated well bore intervals.

3,573,350
COLOR TELEVISION RECEIVER AND COLOR VIDEO TAPE RECORDER SYSTEM

Dong W. Rhee, Williamsville, N.Y., assignor to Sylvania Electric Products, Inc., Seneca Falls, N.Y.

Filed Sept. 28, 1967, Ser. No. 671,336
Int. Cl. H04n *9/02, 9/38, 5/78*
U.S. Cl. 178—5.2 **6 Claims**



An adapter is connected between a color television receiver and a color video tape recorder. During the record operation, the signal taken from the video detector of the television receiver is fed to the adapter network which provides impedance matching between the receiver and the recorder, and the composite video signal is recorder in the color video tape recorder. The video tape recorder includes an RF oscillator such that during the playback cycle the video tape recorder output is the RF signal modulated by the recorded composite video signal. The output of the video tape recorder also includes a 3.58 mc. subcarrier signal synchronized with the color burst from the composite video signal, which is fed through the adapter to the color demodulator input of the television receiver. The subcarrier signal from the video tape recorder is used only to provide demodulation of the color signal in the television receiver. The video tape recorder subcarrier signal is generated in a manner which compensates for variations in speed of the video tape recorder.

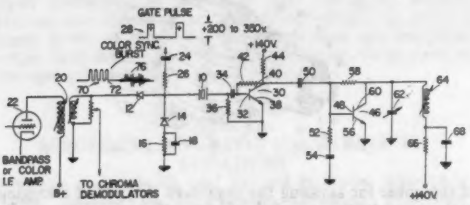
3,573,351
COLOR BURST CIRCUIT FOR A COLOR TELEVISION RECEIVER

Roy M. Elwood, 6008 Moeller Road, Box 151, Fort Wayne, Ind.

Filed Oct. 18, 1967, Ser. No. 676,282
Int. Cl. H04n *9/46*
U.S. Cl. 178—5.4 **10 Claims**

A crystal which serves as a ringing circuit has coupled thereto by means of a diode a composite video signal which contains the color synchronizing burst. Connected to the crystal and the diode are gating pulses which are in time coincidence with the color burst. These gating pulses render the aforesaid diode conductive during the occurrence of only the color synchronizing burst, the diode being nonconductive during the intervals between the gating pulses.

A second diode is connected to the junction between the first diode and the crystal and is rendered nonconductive during the occurrence of the gating pulses but is conductive at all other times.

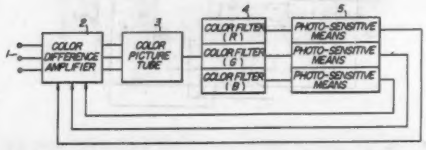


A limiting amplifier is connected to the crystal and contains circuitry which maintains the output signal thereof at a constant level even though the wave train from the crystal may vary in amplitude.

3,573,352
COLOR TONE ADJUSTMENT FOR COLOR TV RECEIVER

Yasuhiro Fujita, Kyoto, Japan, assignor to Matsushita Electronics Corporation, Osaka, Japan

Filed Apr. 8, 1968, Ser. No. 719,420
Claims priority, application Japan, Apr. 13, 1967, 42/23908
Int. Cl. H04n *9/32*
U.S. Cl. 178—5.4 **11 Claims**



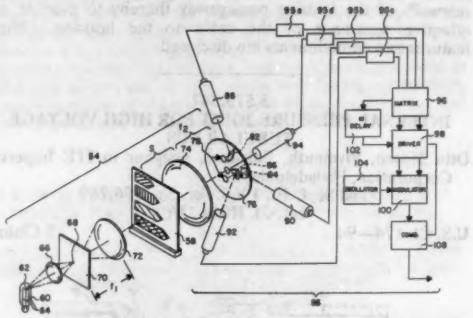
This specification discloses a color television receiver wherein the white balance controlling reference color illumination occurring in a portion of the fluorescent screen is passed through three primary-color filters so as to be separated into "red," "green" and "blue" light rays which are irradiated onto photosensitive elements so that variations in the filtered light rays are converted to electrical quantities to be fed back to the video circuit, thereby directly or indirectly controlling the color reproduction signal voltage to be applied to the color picture tube.

3,573,353
OPTICAL DETECTION SYSTEM AND METHOD WITH SPATIAL FILTERING

Frederick C. Henriques, Washington, D.C.; George B. Parrent, Jr., Carlisle, and Edmund L. Bouche, Lexington, Mass., assignors to Technical Operations, Incorporated, Burlington, Mass.

Filed Dec. 18, 1967, Ser. No. 691,567
Int. Cl. G02b *27/38;* **H04n** *9/08*
U.S. Cl. 178—5.4 **13 Claims**

This disclosure depicts method and apparatus for the optical detection at distinct detection planes of a plural number of distinct images from a record encoded with a plurality of superimposed images multiplied, respectively, with a unique spatially periodic modulation. More particularly, this disclosure depicts method and apparatus for optical image detection which is especially useful in color television film reproduction, simultaneous color separation photography, or the like. The depicted method and apparatus involves Fourier transforming a modulated record to separate in optical channels in transform space spatial frequency spectra of stored images encoded on the record, spatial filtering the transform pattern, and simultaneously detecting distinct images carried in the separated optical channels. Cathode ray pickup tubes and photosensitive emulsions are

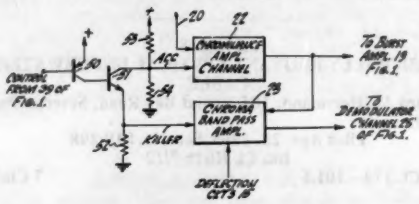


shown and described as alternative ways for separately photodetecting the images carried in the respective channels formed.

3,573,354
COLOR KILLER AND ACC CIRCUITS

Paul R. Ahrens, Indianapolis, Ind., assignor to RCA Corporation

Filed May 22, 1968, Ser. No. 731,037
Int. Cl. H04n *9/48*
U.S. Cl. 178—5.4 **11 Claims**



Color killer action is provided in a color television receiver in response to the output of a burst amplitude detector, through use of a DC amplifier, which operates in a high gain mode for detector outputs below a threshold value, and in a reduced gain mode for detector outputs above the threshold value. The two-mode DC amplifier includes at least one transistor having separate output circuits coupled to its emitter and collector electrodes, with control information for ACC purposes taken from one output circuit, and kill control responsive to the other output circuit. When ACC action is in effect, interference from killer circuit is precluded or reduced to a tolerable degree as a result of amplifier mode shift. Optional arrangements are disclosed that permit setting a threshold for initiation of ACC action that is independent of killer threshold.

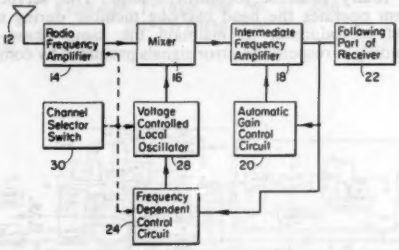
3,573,355
TELEVISION RECEIVER WITH APPARATUS FOR EFFECTING AND MAINTAINING OPTIMUM TUNING

Arthur A. Cavelos, North Syracuse, N.Y., assignor to General Electric Company

Filed Apr. 10, 1969, Ser. No. 814,949
Int. Cl. H04n *5/50;* **H04b** *1/16, 1/68*
U.S. Cl. 178—5.8 **9 Claims**

A television receiver includes an automatic frequency control (A.F.C.) circuit having a frequency dependent response characteristic which is separately adjustable by a user or repairman for each incoming radio frequency television channel. The modulated television video and sound carriers for any selected channel are reduced in frequency to the intermediate frequency (I.F.) range by a heterodyning operation, and the A.F.C. circuit automatically adjusts and maintains the composite I.F. television signal in a preferred

frequency relationship with respect to the pass band of an intermediate frequency amplifier. The receiver thus provides and maintains the best possible reception for each received

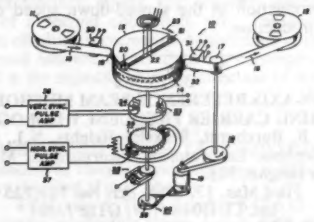


channel having regard to the particular local reception conditions prevailing at the receiver and the subjective preferences of the viewer.

3,573,356
METHOD OF RECORDING SLOW SCAN VIDEO SIGNALS FOR REPRODUCTION AT NORMAL SCAN RATES

Francis G. Toce, Syracuse, N.Y., assignor to General Electric Company

Filed Feb. 9, 1968, Ser. No. 704,474
Int. Cl. H04n *5/78*
U.S. Cl. 178—6.6SF **2 Claims**



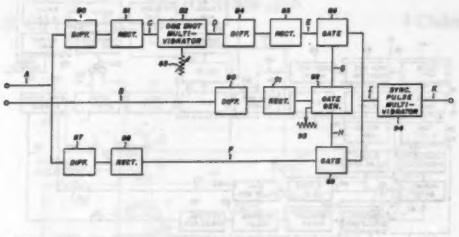
A television recording and reproducing technique for enabling generation and recording of video signals corresponding to images at slow scan rates and reproduction of video signals at normal scan rates without real time errors in the reconstructed images. As applied to a helical scan, skip-field, magnetic tape recorder, video signals are developed at one-half horizontal and vertical scan rates and successive fields of video are recorded in successive tracks on the magnetic tape at one-half the normal recording rate. To provide video for reconstruction of the images, each field of recorded video is scanned twice in succession at the normal rate.

3,573,357
SKIP-FIELD RECORDER WITH ELECTRONICALLY CONTROLLED STOP ACTION CAPABILITY

Francis G. Toce, Syracuse, N.Y., assignor to General Electric Company

Filed Apr. 24, 1968, Ser. No. 723,741
Int. Cl. H04m *1/22, 5/78*
U.S. Cl. 178—6.6 **3 Claims**

A system for providing from a helical scan skip-field magnetic tape recorder composite video having iterative portions corresponding to a single frame to enable such frames to be displayed as stable still pictures on a monitor. With the magnetic tape stationary, the video signals developed from a pair of heads spaced apart by 180° plus the arc corresponding to linear tape travel in the time of one field are combined and every other sync pulse is advanced in relation to the video signal such that corresponding portions

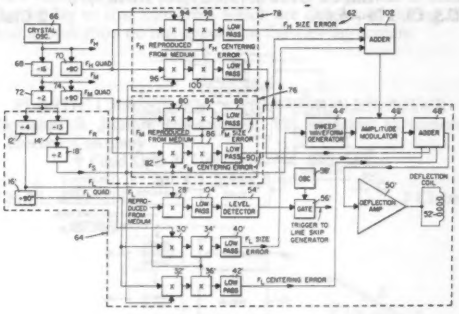


of video in successive identical fields is in the same time relationship to its synchronizing pulse.

3,573,358
TIMEBASE STABILIZATION AND CORRECTION SYSTEM FOR ELECTRON BEAM APPARATUS

Bob V. Markevitch, Palo Alto, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed July 17, 1968, Ser. No. 745,602
Int. Cl. G11b *5/04;* **H04n** *3/18, 3/22*
U.S. Cl. 178—6.6A **10 Claims**



At least one crystal controlled pilot signal, previously recorded on a recording medium, is synchronously demodulated on playback by the same crystal controlled frequency to provide line direction information, and by a quadrature signal to provide basic information on the playback raster size and centering errors, which are then introduced to the sweep generating circuits of the electron beam apparatus for timebase correction of the reproduce signals.

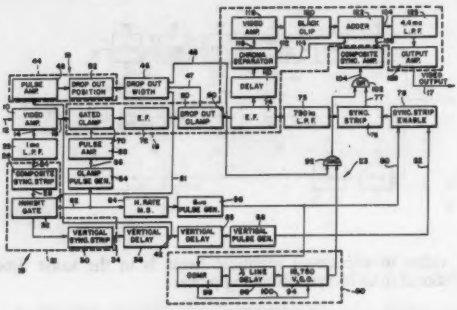
3,573,359
VIDEO TAPE APPARATUS HAVING SYNC SIGNAL CONTROL DROPOUT COMPENSATION

Barrett Earl Guisinger, Deerfield, Ill., assignor to Ampex Corporation, Redwood City, Calif.

Filed May 6, 1968, Ser. No. 726,867
Int. Cl. G11b *5/04;* **H04n** *5/78*
U.S. Cl. 178—6.6 **32 Claims**

A recorded composite video signal having periodic dropout intervals is processed by a system which provides an indication of the position and duration of such dropout intervals and maintains the output signal at a fixed level during these intervals. Circuitry may be provided for inserting horizontal synchronizing pluses during each dropout interval. A system is also disclosed which detects the dropout intervals, and is employed in the above processing system as well as in a system for maintaining the stretch of the recording tape-medium constant by deriving a signal

indication thereof from comparison of the horizontal synchronizing pulses before and after each dropout interval.



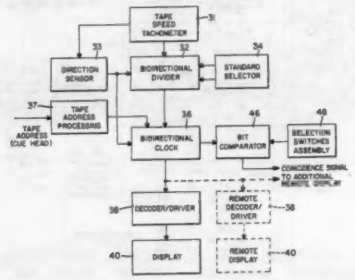
A tension-controlling mechanism is responsive to the signal, and applies suitable tension on the tape.

3,573,360

ELECTRONIC WEB TIMER

Marshall G. Rose, Jr., Cupertino, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Dec. 13, 1968, Ser. No. 783,687
Int. Cl. G11b *23/36, 27/16;* **H04n** *5/78*
U.S. Cl. 178—6.6A **2 Claims**



An electronic timer network for a web transport system, e.g. a video tape recorder/reproducer system. Means are incorporated for sensing the web direction and speed and providing electrical signals indicative of the direction and speed. The electrical speed indications are converted to pulses repetitious at a rate based upon segments of time, e.g. seconds or fractions of seconds. The pulses are converted to binary code format for transmission to remote locations and then decoded to decimal format to drive display units indicating the elapsed tape.

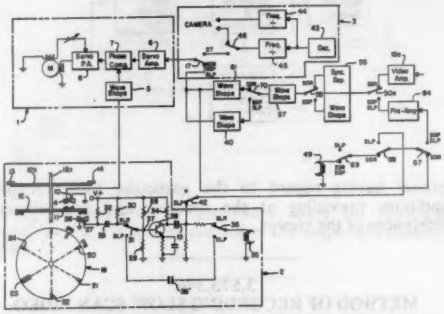
3,573,361

SERVO CONTROL SYSTEM FOR VIDEO-TAPE RECORDER WITH SLOW-MOTION REPRODUCING CAPABILITY

Fujiaki Narita, Amagasaki, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi-shi, Japan

Filed Sept. 12, 1969, Ser. No. 857,323
Claims priority, application Japan, Sept. 14, 1968, 43/66281
Int. Cl. G11b *5/00;* **H04n** *5/08, 5/78*
U.S. Cl. 178—6.6 **13 Claims**

A servosystem for controlling the rotary phase of the heads of a video-tape recorder with slow-motion reproducing capability in which tape transporting means convey a tape along the periphery of a cylindrical guide member within which rotates a rotary member having rotary heads thereon at the slowed-down speed of $1/n$ that of the recording speed during slow-motion reproduction. The system includes first pulse generating means for generating a series of standard control pulses in relation to the recorded signals, second pulse generating means to generate a series of slow-motion control pulses which have n times the frequency of said standard pulses, recording means for recording both said control pulses on the tape along its longitudinal direction, and rotary head servocontrol system. The servocontrol system operates the head carrying member during normal speed reproduction to maintain the same phase as in recording in response to error signals produced by comparing



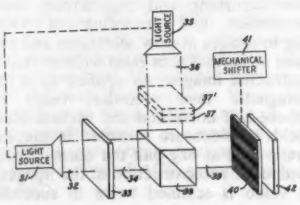
phase detecting signals from the rotating member carrying the heads with the reproduced standard control signals. During slow speed reproduction error signals to operate the servosystem are produced by comparing phase detecting signals from the rotating member with recorded slow-motion control signals which have the same frequency as the standard control signals when the tape is transported in slow motor reproduction at the slowed-down speed of $1/n$ that normal reproduction.

3,573,362

AN ON-AXIS REFERENCE BEAM METHOD FOR FORMING CARRIER FREQUENCY HOLOGRAMS

Christoph B. Burchardt, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Mar. 13, 1968, Ser. No. 712,725
Int. Cl. H04n *5/84;* **G11c** *13/04*
U.S. Cl. 178—6.7 **27 Claims**



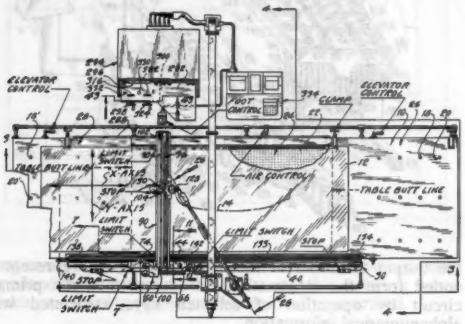
In one embodiment of this invention, a reference beam and an information-bearing beam are combined into a collinear beam and then directed through a mask onto a recording medium. In one direction this mask has a periodic variation in intensity transmissivity. After the first exposure, the mask is shifted a distance equal to one-third the spatial period of its transmissivity variation; and a one-third waveplate is inserted in the path of either the reference beam or the information beam to effect a 120° phase shift therein. A second exposure is then made. In similar fashion a third exposure is made with a similar mask shift and an additional 120° phase shift.

Other embodiments, producing effects similar to those formed by masking but with the added advantage of bandwidth reduction, are also disclosed.

3,573,363
COORDINATE AXIS DRIVE SYSTEM FOR A COORDINATOGRAPH

William A. Ford, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Apr. 1, 1968, Ser. No. 717,850
Int. Cl. H04n 5/30
U.S. Cl. 178—6.8 11 Claims

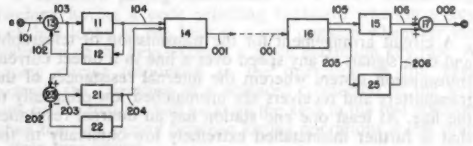


This specification describes a control system for a two-dimensional scanner head in a coordinatograph. A closed electrical circuit comprising a synchrotorque transmitter and a synchrotorque receiver is used to power the scanner assembly along coordinate one axis. Another closed electrical circuit comprising a control transmitter and a control transformer power the scanner assembly in the direction of a second coordinate axis. The friction forces involved in effecting incremental adjustments in the direction of the second axis are higher than the corresponding forces developed in the adjustment in the direction of the first axis.

3,573,364
BAND-COMPRESSED SIGNAL TRANSMISSION SYSTEM

Tadao Shimamura, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan

Filed Aug. 5, 1969, Ser. No. 847,632
Claims priority, application Japan, Aug. 8, 1968, 55807/43
Int. Cl. H04n 7/12
U.S. Cl. 178—6.8 15 Claims

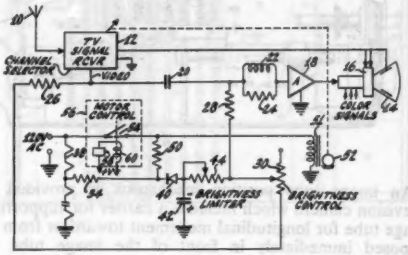


A band-compressed delta modulated signal communication system for transmitting an information signal admitting of abrupt variations in amplitude is disclosed in accordance with the teachings of the present invention wherein delta modulating means operable at a first frequency and at a first quantizing level generates a first pulse signal representative of gradual variations in the amplitude of said information signal and pulse modulating means responsive to said delta modulating means and operable at a second frequency and at a second quantizing level generates a second pulse signal representative of abrupt variations in the amplitude of said information signal. The first and second pulse signals are transmitted to a receiving station whereat said first and second pulse signals are demodulated to derive first and second analog signals which are combined to reproduce said information signal.

3,573,365
VIDEO MUTING CIRCUITS

George E. Anderson, Indianapolis, Ind., assignor to RCA Corporation

Filed Oct. 25, 1968, Ser. No. 770,728
Int. Cl. H04n 5/16
U.S. Cl. 178—7.3 4 Claims

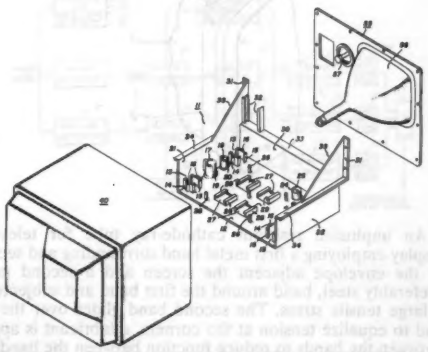


A kinescope used in a television receiver is automatically blanked when the receiver is being tuned by a motor driven tuning arrangement. The activation of the tuning mechanism automatically applies a suitable potential to the kinescope, via a video amplifier stage, of a sufficient magnitude to blank the display so that transients which are developed during the tuning operation do not appear on the viewing screen.

3,573,366
PLASTIC CHASSIS FOR A TELEVISION RECEIVER

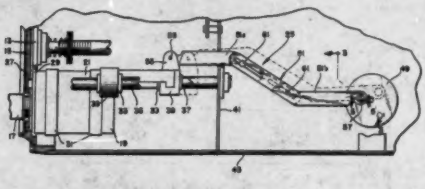
Raymond S. Joseph, Chesapeake, Va., assignor to General Electric Company

Filed Oct. 2, 1967, Ser. No. 672,343
Int. Cl. H04n 5/645
U.S. Cl. 178—7.8 2 Claims



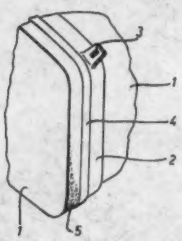
In a television receiver, a plastic chassis comprises a substantially rigid base portion which serves as the sole means of support for a television receiver and includes a plurality of integrally molded mounting means for electronic components of the television receiver. The integrally molded mounting means include boss members, flexible pocket members, and flexible cup members. The cathode ray tube of the television receiver is also mounted on the plastic chassis on a front wall portion to provide an exposed though totally operative subassembly prior to the final steps in the assembly process. The plastic chassis is further adapted to receive closure panels of a rear closure member in integrally molded track members of the base portion to substantially complete the assembly.

3,573,367
CAMERA FOCUSING MEANS
Mervin W. LaRue, Jr., Barrington, Ill., assignor to Ampex Corporation, Redwood City, Calif.
Filed Apr. 24, 1968, Ser. No. 723,688
Int. Cl. H04n 5/26
U.S. Cl. 178—7.92 13 Claims



An image tube position mechanism is provided for a television camera which includes a carrier for supporting the image tube for longitudinal movement toward or from a lens disposed immediately in front of the image tube as an operator manipulates a manually operable knob mounted on the camera. The knob is connected to the carrier by a focus control mechanism which achieves a similar change in focus with a given turning movement of the knob irrespective of whether or not the object is near or far with respect to the lens.

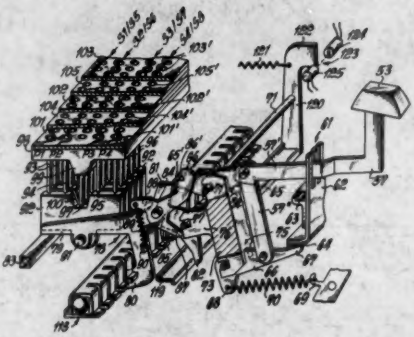
3,573,368
CATHODE RAY TUBE IMPLOSION GUARD WITH BEESWAX ANNULAR METAL FRAME AND METAL BAND
Friedrich Kober, Aachen, Germany, assignor to U. S. Philips Corporation, New York, N.Y.
Filed Apr. 15, 1968, Ser. No. 721,486
Claims priority, application Germany, May 11, 1967, P42115
Int. Cl. H01j 29/82
U.S. Cl. 178—7.8 1 Claim



An implosion resistant cathode-ray tube for television display employing a first metal band surrounding and secured to the envelope adjacent the screen and a second metal, preferably steel, band around the first band and subjected to a large tensile stress. The second band glides over the first and to equalize tension at the corners, a lubricant is applied between the bands to reduce function between the bands. As a lubricant, beeswax is preferred.

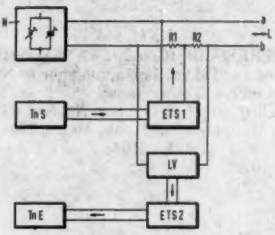
3,573,369
KEY-CONTROLLED INDUCTIVE INPUT ARRANGEMENT
Gerhard Konig; Helmut Schmidt, and Klaus Singer, Villingen, Germany, assignors to Kienzle Apparate G.m.b.H., Villingen, Black Forest, Germany
Filed Mar. 18, 1968, Ser. No. 714,127
Claims priority, application Germany, Mar. 18, 1967, K61767
Int. Cl. H04l 15/12
U.S. Cl. 178—17 16 Claims

A primary circuit of a printed circuit plate is inductively coupled with a secondary circuit of a printed circuit plate when a key-controlled core pin connects a coupling loop of the primary circuit with a coupling loop of the secondary circuit. The coupling loops of the secondary circuit are arranged in accordance with a binary code so that pulses at



the output terminals of the secondary circuit represent in coded form the information introduced into the primary circuit by operation of selected keys associated with alphanumerical information.

3,573,370
CIRCUIT ARRANGEMENT FOR THE TRANSMISSION OF TELEGRAPHY AND DATA SIGNALS
Hans Blauert, 3 Karntner-Platz, 8 Munich 21, and Ernst Schuhbauer, 6 Prochintalstr, 8 Munich 54, Germany
Filed Mar. 13, 1969, Ser. No. 807,773
Claims priority, application Germany, Mar. 20, 1968, 4138/68
Int. Cl. H04l 5/14, 25/08
U.S. Cl. 178—58 2 Claims

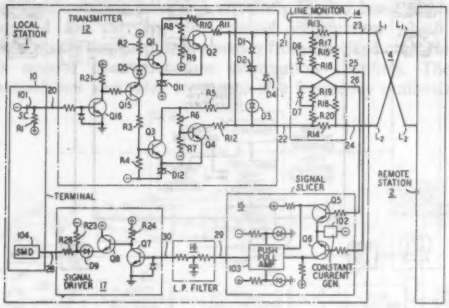


A circuit arrangement for the transmission of telegraphy and data signals at any speed over a line in a direct current transmission system wherein the internal resistances of the transmitters and receivers are mismatched low-ohmically to the line. At least one end station has an internal resistance that is further mismatched extremely low-ohmically to the line.

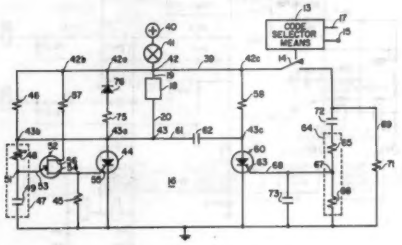
3,573,371
DIRECT-CURRENT DATA SET ARRANGED FOR POLAR SIGNALING AND FULL DUPLEX OPERATION
John T. Carbone, Englishtown, N.J., and George Parker, New York, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 23, 1968, Ser. No. 786,118
Int. Cl. H04l 5/14
U.S. Cl. 178—60 6 Claims

The direction and magnitude of the cumulative polar loop currents on a full duplex two-wire line are monitored by an impedance network which is connected across the signal battery transmitter, the line loop and the line monitor in a manner which enables the monitor to detect incoming marking and spacing currents. The network is arranged to

balance or cancel out ground or longitudinal currents that the line loop might apply across the monitor. The application of outgoing signal currents across the monitor is compensated by diodes which alternatively remove or insert impedances in opposing branches of the network when marking or spacing signals are being locally generated.



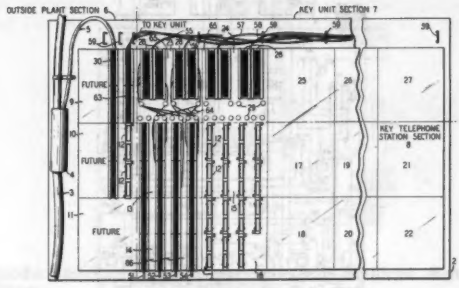
3,573,372
KEYBOARD PACING MECHANISM
John P. Talone; Frederick H. Dear, and Hugh St. Lawrence Dannatt, Rochester, N.Y., assignors to The Singer Company
Filed May 31, 1968, Ser. No. 733,531
Int. Cl. B41j *5/20, 29/69;* **H04l** *17/8*
U.S. Cl. 178—81 **5 Claims**



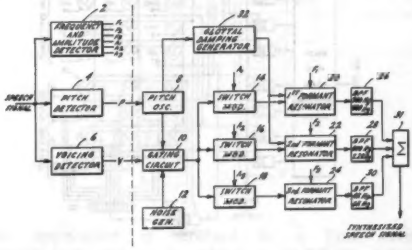
A keyboard pacing mechanism for a code transmitting machine having a code selecting keyboard wherein a key lock bail locks all the keys in a rest position whenever the operation of the keys exceeds a given maximum key rate. A pacing circuit responsive to the operation of the keys controls the operation of a solenoid connected to the key lock bail so that the bail locks all the keys in the rest position when the time period between keying operations is less than a given time period.

3,573,373
CABLE TERMINATING SYSTEM FOR KEY TELEPHONE CLOSETS
Francis J. Mullin, Baltimore; Raymond B. Ramsey, Towson, and Christian Scholly, Baltimore, Md., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.
Filed Mar. 21, 1968, Ser. No. 714,994
Int. Cl. H04g *1/14*
U.S. Cl. 179—98 **4 Claims**

A building-block approach to terminal arrangements in a key telephone station closet is described in which the connector blocks are mounted in functional groups. Each group is expandable within the closet by virtue of factory-provided boards equipped with prepositioned mounting brackets for the blocks. The board size and bracket spacing is such that jumper wires are led either vertically or horizontally between the brackets with the aid of open finger guides instead of rings. Lead-in cable is run beneath the connector block brackets, leaving the space between blocks exclusively for jumper leads.



3,573,374
FORMANT VOCODER UTILIZING RESONATOR DAMPING
Louis R. Focht, Huntingdon Valley, and James M. Loe, Willow Grove, Pa., assignors to Philco-Ford Corporation, Philadelphia, Pa.
Filed Jan. 25, 1968, Ser. No. 700,542
Int. Cl. G10l *1/00, 1/04*
U.S. Cl. 179—1 **3 Claims**

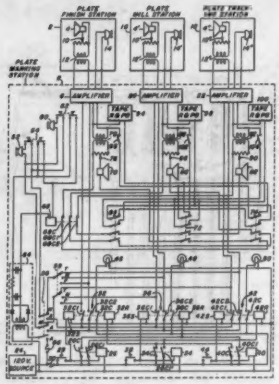


A formant vocoder comprising formant resonators and means for damping the resonators just prior to each successive pitch pulse. Damping is achieved by changing the Q of the resonators.

3,573,375
COMMUNICATIONS SYSTEMS CONTROLLER
Dan J. Kinzer, Orem, Utah
Filed Nov. 13, 1968, Ser. No. 775,321
Int. Cl. H09m *9/04*
U.S. Cl. 179—1 **5 Claims**

A central station controller for a multiple system intercommunicating device sets a latching relay to connect a central station microphone to a system determined by a selector. The selector also uses a tripping relay to release the

latching relays on all other systems. Provision is made to silence all but one central station loudspeaker and to record



and later play back messages which would otherwise be heard on the silenced speaker.

3,573,376

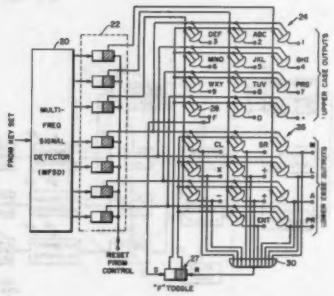
SIGNALLING SYSTEM WITH UPPER AND LOWER CASE DESIGNATIONS

William F. Bartlett, East Rochester; Barrie Brightman, Webster; Uno Randmere, Rochester, and Richard Scott, Fairport, N.Y., assignors to Stromberg Carlson Corporation, Rochester, N.Y.

Division of Ser. No. 618,870, Feb. 27, 1967, abandoned. Dec. 29, 1969, Ser. No. 888,221

Int. Cl. H04m *11/00*

U.S. Cl. 179—2 **2 Claims**



A signalling system for remote operation of a calculator which requires 22 distinguishable input signals. A standard 12-key key set is used at the local station. One key is designated a shift key, and the central office equipment is arranged to direct the signal next following actuation of the shift key to a different input of the calculator from the one to which it would otherwise be directed.

3,573,377

EQUIPMENT TO COORDINATE ESTABLISHMENT OF AUDIO AND VIDEO CONNECTIONS THROUGH SWITCHING SYSTEMS

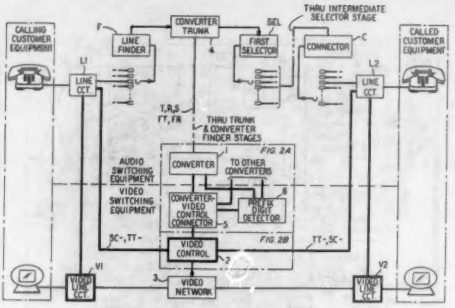
Harold P. Anderson, Lincroft, and James L. Simon, Middletown, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 24, 1969, Ser. No. 801,575

Int. Cl. H04m *11/00;* **H04n** *7/14*

U.S. Cl. 179—2 **22 Claims**

A video switching system is provided for augmenting an existing audio switching system to extend video paths between customer video equipments. The video and audio paths are essentially independently established via separate



switching system networks and equipment is included for coordinating and verifying each system connection to assure only matching audio and video paths are established.

3,573,378

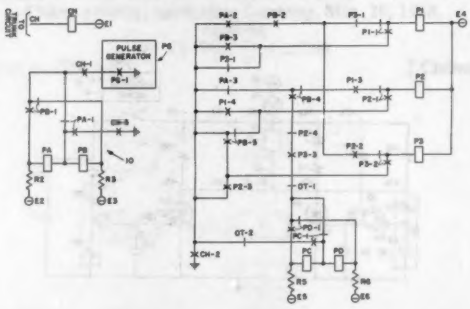
TELEPHONE CALL TIMING CIRCUIT

Derek Leyburn, St. Laurent, Quebec, and James S. Kyles, Pointe Claire, Quebec, Canada, assignors to The Bell Telephone Co. of Canada, Montreal, Quebec, Canada

Filed Apr. 11, 1968, Ser. No. 720,636

Int. Cl. H04m *15/18*

U.S. Cl. 179—7.1 **6 Claims**



A timing circuit which includes a pulse generator for generating a train of timed pulses for the duration of a data call on a telephone line. A first counting circuit repeatedly counts a predetermined number of pulses and generates an output pulse at the end of each group of pulses. A second counting circuit counts a predetermined number of output pulses from the first counting circuit and generates a further output pulse which operates a relay to energize an overtime register and disable the second counting circuit. The overtime register subsequently registers every time the first pulse of a group of pulses is counted.

3,573,379

COMMUNICATIONS SYSTEM WITH FREQUENCY AND TIME DIVISION TECHNIQUES

Donald W. Schmitz, and Benjamin Chandler Shaw, Granada Hills, Calif., assignors to The Bendix Corporation

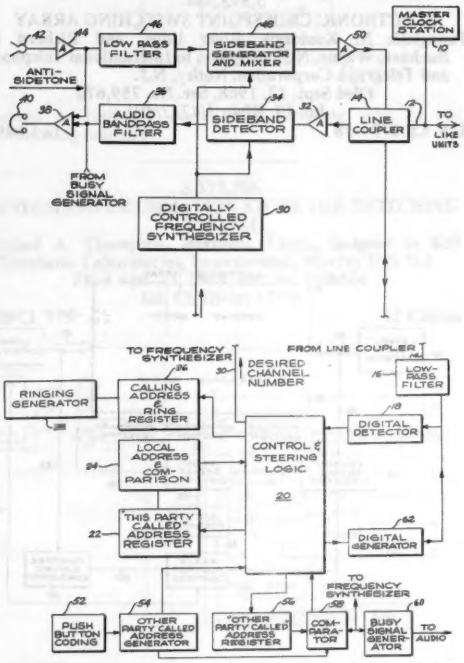
Filed Mar. 3, 1969, Ser. No. 803,867

Int. Cl. H04j *3/12*

U.S. Cl. 179—15 **17 Claims**

A communication system for a substantial number of subscribers is shown having random access capabilities without the requirement for the usual central exchange. The system uses a frequency division scheme for separating the several communication information channels. The individual

subscriber units are interconnected as by means of one or more wires which are also connected to a master clock which continually generates time division digital information consisting of a plurality of pulses and unused time spaces (ones and zeros) including binary circuit code information and synchronizing pulses. A relatively limited band width is required for carrying this control information which is substantially displaced in frequency from the band containing the several communication information channels. These channels are generated by means of a frequency synthesizer



in each of the subscriber units, each of which continually monitors the digital control information to determine whether its address is being called and the circuit code representing the channel of the incoming call. Similarly, outgoing calls are initiated by picking up a headset at the subscriber unit which causes an unused channel to be selected, inserting its circuit code into the digital stream and causing the frequency synthesizer in responding to this code to generate the corresponding carrier frequency. The audio information is then converted to single side band (or other) modulation of the particular carrier frequency signal.

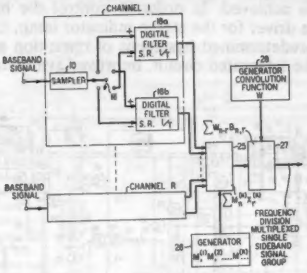
3,573,380

SINGLE-SIDEBAND MODULATION SYSTEM

Sidney Darlington, Passaic Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 15, 1969, Ser. No. 824,784
Int. Cl. H04j *1/18;* **H03c** *1/60*
U.S. Cl. 179—15 **20 Claims**

A multichannel, frequency-division multiplex, single-sideband modulation system is realized by using digital filters and product modulators in lieu of conventional analog filters and product modulators. Extremely high multiplication rates resulting from a direct substitution of digital for analog operations are substantially reduced by using multirate digital filters and a combined multichannel implementation of said



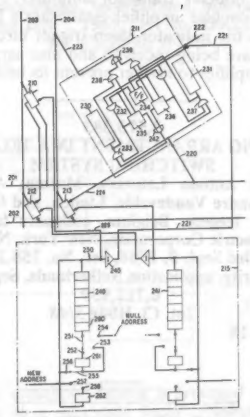
product modulators and a portion of said multirate digital filters.

3,573,381

TIME DIVISION SWITCHING SYSTEM

Michael J. Marcus, Cambridge, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 26, 1969, Ser. No. 810,618
Int. Cl. H04j *3/16*
U.S. Cl. 179—15 **18 Claims**



This application is directed to a time division communication system in which a switching network, comprising combination crosspoint switching and data storage devices, transposes data among various time channels during its transmission between multichannel, time multiplex highways.

3,573,382

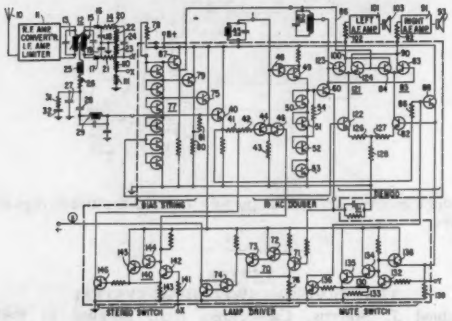
A STEREOPHONIC RECEIVER MUTING MEANS WITH SUBSTITUTION OF A DC CIRCUIT FOR AN AC CIRCUIT

James H. Feit, Chicago, and Francis H. Hilbert, River Grove, Ill., assignors to Motorola Inc., Franklin Park, Ill.

Filed Feb. 6, 1969, Ser. No. 797,039
Int. Cl. H04h *5/00*
U.S. Cl. 179—15 **18 Claims**

A silicon monolithic integrated circuit stereo multiplex receiver includes a gated symmetrical demodulator for providing the desired left and right audio output signals. A second demodulator is supplied with the same composite input signal supplied to the first demodulator, but substantially attenuated, with the second demodulator providing output signals 180° out of phase with the signal supplied by the first demodulator; and the outputs of the two demodulators are combined so that the crosstalk components

are effectively eliminated. A provision also is made for interstation audio muting and for stereo muting by the direct substitution of equivalent DC loads for the AC amplifiers normally responding to the signals, so that transientless muting is achieved. In order to control the muting and to provide a driver for the stereo indicator lamp, trigger circuits having predetermined hysteresis of operation are formed as part of the integrated circuit. Improved symmetrical drive for



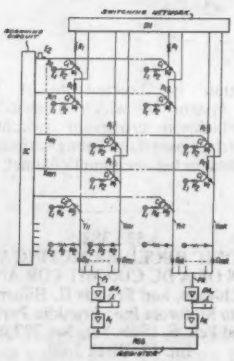
the demodulator circuit is obtained by feeding the 19 k.c. pilot signal to the doubler circuit across a string of diodes which logarithmically compress signals that would tend to overdrive the doubler transistor amplifier. A filter at the emitter of the doubler amplifier establishes a DC level which is used to fire the indicator lamp trigger circuit to indicate stereo signals are being received and also serves to self-bias the doubler amplifier to further prevent its being overdriven.

3,573,383

SCANNING ARRANGEMENT IN A TELEPHONE SWITCHING SYSTEM

Andre Ernest Antoon Lauwers, Muizen; Armand Marie Cecile Alexandre Vandevelde, Linden, and Gerard Richard Josef Lezy, Izegem, Belgium, assignors to International Standard Electric Corporation, New York, N.Y.

Filed Sept. 9, 1968, Ser. No. 758,216
Claims priority, application Netherlands, Sept. 22, 1967, 6,712,959
Int. Cl. H04q *3/48*
U.S. Cl. 179—18 **6 Claims**



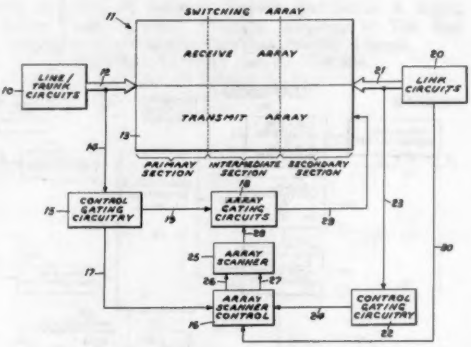
In a switching system, a scanning arrangement is provided to interrogate a plurality of links interconnecting a plurality of switching stages of the system for determining their busy and idle conditions. The scanning arrangement includes a plurality of diode-gating means responsive to the interrogating signals for applying the busy and idle status signals of the links to the register means of the system wherein each of said diode-gating means is coupled to the scanning means and the register means and to a corresponding one of the plurality of links. Each of the diode gating means includes a DC potential source, a junction, first resistor coupling the DC potential source to the junction, second resistor coupling the junction to the corresponding link, a capacitor coupling the scanning means to the junction, and a diode being coupled to the junction and being poled to change from a nonconductive to conductive state in response to the change in the condition of the corresponding link from an idle to busy condition. The system is also provided with a plurality of biasing means, each means establishing a predetermined common bias potential level at the output of a selected number of the plurality of the diode-gating means.

3,573,384

ELECTRONIC CROSSPOINT SWITCHING ARRAY

Panagiotis N. Konidaris, River Edge, and Richard E. Buchner, Wayne, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Sept. 13, 1968, Ser. No. 759,670
Int. Cl. H04q *3/42, 3/495*
U.S. Cl. 179—18 **12 Claims**



A crosspoint switching array of four-layer semiconductor devices in which complete connection through the array is established by selecting and firing only the minimum number of crosspoints necessary for that complete connection to be made. Activation of said minimum number of crosspoints is independent of the inherent rate effect characteristics of the crosspoints devices. The crosspoint switching array provides a selection of crosspoints based on availability rather than on the device characteristics and array support equipment.

3,573,385

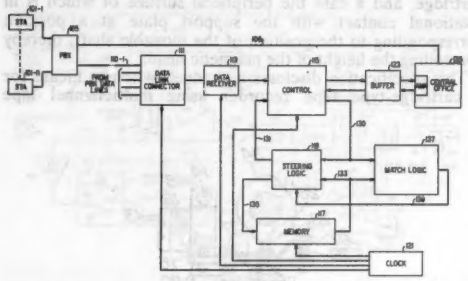
OUTDIALING INFORMATION STORE FOR SWITCHING SYSTEM

Charles J. Provenzano, Staten Island, N.Y., and Richard A. Thompson, Hartford, Conn., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 23, 1969, Ser. No. 818,563
Int. Cl. H04m *15/06*
U.S. Cl. 179—18 **16 Claims**

A telephone switching system is described in which a central office and a plurality of private branch exchanges are interconnected by trunks. A serially arranged recirculating memory associated with the central office receives a calling station and trunk identity message over a data link, and the station identity code is stored in one of a group of discrete storage areas in the memory. The station identity code is

preceded by the trunk code so that the calling station code, as addressed by the received trunk information, may be



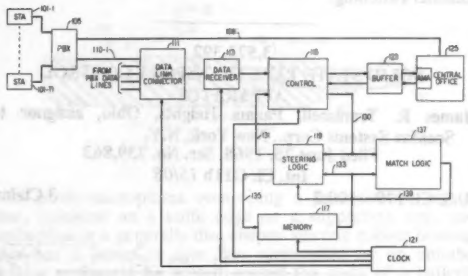
inserted or retrieved during one complete scan of the recirculating memory.

3,573,386

OUTDIALING INFORMATION STORE FOR SWITCHING SYSTEM

Richard A. Thompson, Hartford, Conn., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Apr. 23, 1969, Ser. No. 818,564
Int. Cl. H04m *15/06*
U.S. Cl. 179—18 **13 Claims**



A telephone switching system is described in which a central office and a plurality of private branch exchanges are interconnected by trunks. A serially arranged recirculating memory associated with the central office receives a calling station and trunk identity message over a data link, and the exchange and station identity codes are stored in one of a group of discrete storage areas in the memory. Calling exchange and station identity codes as addressed by the received trunk identity code may then be inserted or retrieved from the memory.

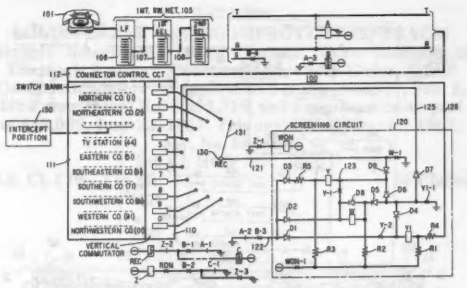
3,573,387

SCREENING OF MISDIALED CALLS IN STEP-BY-STEP LOCAL LEVEL HUNTING CONNECTORS

Carl R. Nebe, Norwalk, and James T. Switzer, Walnut, Calif., assignors to American Telephone and Telegraph Company, New York, N.Y.

Filed May 6, 1969, Ser. No. 822,150
Int. Cl. H04m *3/52*; **H04q** *3/38*
U.S. Cl. 179—18 **7 Claims**

A circuit is disclosed for screening misdialed calls in a local level hunting connector which may have line appearances both for normal subscribers as well as for a subscriber receiving an especially high volume of calls. The normal subscribers appearing on the connector are assigned directory numbers ending in 1 while the high volume subscriber is assigned a specific "tens" digit. The connector is prevented from responding directly to any tens digit until the first pulse of the units digit is received. The connector is then "unlocked" and permitted to hunt as it normally would. However, if a subsequent pulse is received, indicating a units digit other than 1, the normally grounded commutator segment corresponding to the tens digit becomes ungrounded and a commutator segment connected to an intercept position is grounded unless the tens digit is the specific one assigned to the high volume subscriber.

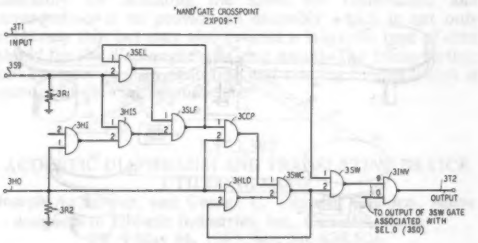


3,573,388

MARKER CONTROLLED ELECTRONIC CROSSPOINT

Clarence H. Dagnall, Jr, Westerville, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 7, 1969, Ser. No. 839,215
Int. Cl. H04q *3/42*
U.S. Cl. 179—18 **11 Claims**



An electronic crosspoint matrix is arranged to operate in parallel with or as a substitute for a crossbar switch in a common control switching system. Each electronic crosspoint, which consists of an output gate controlled by a plurality of other gates, can be operated, held and released in the same manner as a conventional metallic crosspoint. High frequency data is switched through each crosspoint in response to a marking signal received on an associated select lead followed by receipt of a marking signal on an associated hold lead. Once operated, a crosspoint remains operated under control of the associated hold lead.

3,573,389

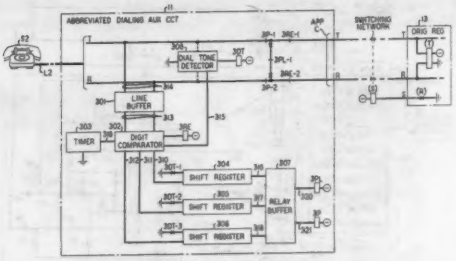
SWITCHING SYSTEM WITH INDIVIDUAL REGISTER CONTROL

Martin R. Greenstein, Villa Park, Ill., and Alfred Zarouni, Middletown, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Dec. 18, 1968, Ser. No. 784,749
Int. Cl. H04m *3/54*
U.S. Cl. 179—18 **19 Claims**

Special services, such as call transfer and abbreviated dialing, are provided by auxiliary circuits each uniquely associated with certain subscriber lines in a common control-switching system. The auxiliary circuit is arranged with shift registers to recognize the dialing of a predetermined code and to respond thereto by releasing and reenabling the

common control switching equipment. On abbreviated dialing calls, the return of dial tone by the reenabled central office register enables the auxiliary circuit to outpulse the directory number of the desired station. On transfer calls, after dialing the access code, the subscriber primes the



transfer feature by dialing the directory number of the transfer station. This number is then simultaneously stored in the auxiliary circuit and in the reenabled central office register. In either situation the call then progresses to completion in the normal manner.

3,573,390

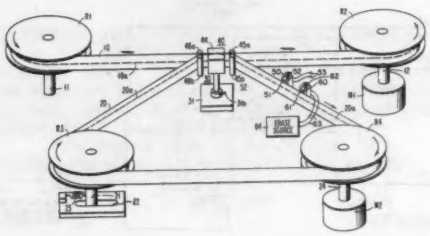
MAGNETIC TRANSDUCING SYSTEM

William T. Frost, Los Gatos, and Armand P. Neukermans, Stanford, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1969, Ser. No. 791,418

Int. Cl. G11b *5/86*

U.S. Cl. 179—100.2E **8 Claims**



A system for using a first magnetic head that develops flux lines transverse to the direction of a magnetic track for transposing a high density recording on the track by magnetic transfer to another tape which is arranged in a loop configuration. A second head with a relatively short magnetic gap is then utilized to read out this high density recording of the single track on the second tape. Thus, the head requirement for read out of the narrow track high density recording is essentially divided into two heads rather than being dependent upon a singular head having a single gap that is both short and narrow.

3,573,391

CHANNEL SWITCHING MEANS FOR A CARTRIDGE-TYPE TAPE RECORDER

Akira Harada, Tokyo, and Shogo Nakayama, Suwa-shi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan

Filed Oct. 23, 1967, Ser. No. 677,484

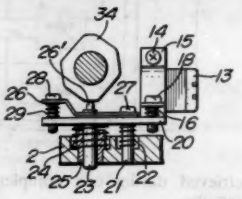
Claims priority, application Japan, Oct. 25, 1966, 41/71110; 41/71111; 41/1112; 41/71113

Int. Cl. G11b *21/08*

U.S. Cl. 179—100.2 **4 Claims**

A cartridge-type tape recorder, wherein channel selection can be positively carried out through providing a single magnetic head, the magnetic head being mounted on a support plate urged in one direction by means of a pin provided perpendicularly with respect to the insert plane of the cartridge and an elastic member provided on a movable shaft fixed to the support plate, the support plate being maintained parallel to the plane of insertion of a tape cartridge, and a cam the peripheral surface of which is in rotational contact with the support plate at a position corresponding to the position of the movable shaft, thereby controlling the height of the magnetic head.

This specification discloses a channel switching means for a cartridge-type tape recorder using multichannel tape



having a plurality of tracks, wherein the channel selection can be positively carried out through the use of a single magnetic head and the head is mounted on a support plate adapted for parallel motion by means of a spring and a pin perpendicularly provided with respect to the insert plane of the cartridge and a channel switching cam is rotatably provided contacting the support plate at a position corresponding to the said spring and the height of the magnetic head is controlled by the cam, thereby effecting the channel switching.

3,573,392

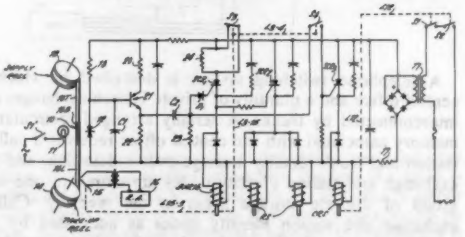
SOLID STATE TAPE TRANSPORT CONTROL APPARATUS

James R. Trammell, Parma Heights, Ohio, assignor to Scanfax Systems Corp., New York, N.Y.

Filed June 25, 1963, Ser. No. 739,863

Int. Cl. G11b *15/08*

U.S. Cl. 179—100.2 **3 Claims**



An arrangement for controlling the recording head and the direction of magnetic tape movement in a tape recording machine is disclosed in which the translucency of the magnetic tape is monitored to detect the appearance of the leader and trailer portions of the magnetic tape.

3,573,393

TAPE HANDLING CONTROL ELEMENT AND SYSTEM FOR REVERSAL OF TAPE MOVEMENT DURING LOW SOUND LEVELS

James W. F. Blackie; Gregory J. Maleski, Sunnyvale; Chester W. Newell, San Jose, and Charles A. Vogel, Sunnyvale, Calif., assignors to Newell Industries, Inc., Sunnyvale, Calif.

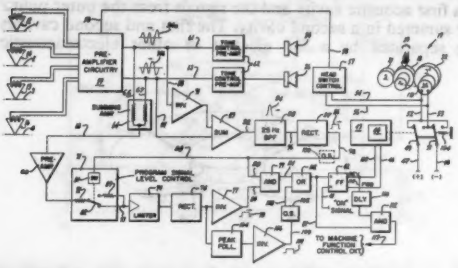
Filed June 26, 1967, Ser. No. 648,665

Int. Cl. G11b *15/06, 15/18, 21/08*

U.S. Cl. 179—100.2 **4 Claims**

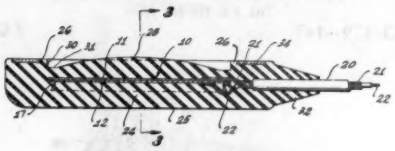
A control system for handling elongated pliable recording tape where the tape carries an antiphase control signal which

preconditions the playback apparatus whereby reversal of the tape will occur in response to a subsequent predetermined



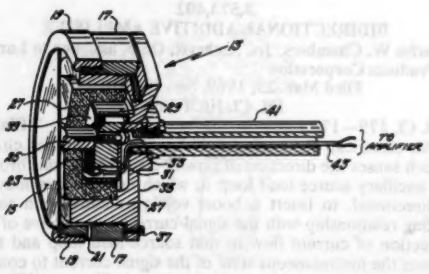
drop in signal level of the reproduced program being played back.

3,573,394
PIEZOELECTRIC MICROPHONE WITH BIASING MEANS
William S. Birnbaum, Fullerton, Calif., assignor to Industrial Scientific Research Corporation, Anaheim, Calif.
Filed Sept. 14, 1967, Ser. No. 667,736
Int. Cl. H04r *17/02*
U.S. Cl. 128—2.05 **6 Claims**



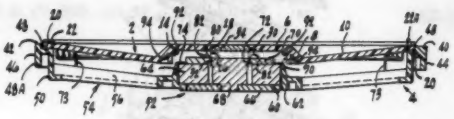
A cardio-microphone comprising a piezoelectric crystal disc, mounted on a knife edge on a supporting ring, and embedded in a generally disc-shaped silicone rubber housing that has a dome on one side surrounded by an annular seating surface to be seated against the body of a patient. The dome projects beyond the seating surface, and, when it and the annular seating surface engage the body of the patient, the crystal disc on the inside receives center pressure which forces it into a dished shape and thereby provides it with a preliminary bias.

3,573,395
FIREPROOF ELECTRICAL ISOLATION SPEAKER
Henry B. Whitmore, Rte. 5, Box 369, San Antonio, Tex.
Filed July 10, 1968, Ser. No. 743,807
Int. Cl. H04r *13/02*
U.S. Cl. 179—114 **2 Claims**



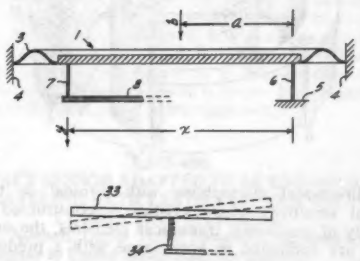
A fireproof loudspeaker having a nonflammable sealing member positioned over the current carrying elements thereof to prevent possible spark or heat radiation from reaching the installation area by isolating the electrical elements while maintaining the speaker at substantially full magnetic efficiency.

3,573,396
LOUDSPEAKER HAVING IMPROVED DIAPHRAGM
Herbert Schoengold, Mount Vernon, N.Y., assignor to Electronic Research Associates, Inc., Cedar Grove, N.J.
Continuation-in-part of application Ser. No. 342,827, Feb. 5, 1964, now Patent No. 3,351,719, and a continuation-in-part of 648,089, June 22, 1967. This application Nov. 17, 1967, Ser. No. 688,296
Int. Cl. H04r *7/02, 9/06*
U.S. Cl. 179—115.5R **14 Claims**



A loudspeaker assembly of a thin, compact, lightweight construction having a diaphragm which preferably is formed of cellular plastic material and provided with an integral marginal gasket. The diaphragm is mounted on a frame which is preferably formed of a solid body of the same or acoustically similar plastic material. The diaphragm has a concavo-convex form modified with acoustical materials and is capable of faithfully reproducing low frequency, midrange, and high frequency vibrations. The diaphragm is actuated by a voice coil mounted at the rear of the convex zone of the diaphragm, whereby the diaphragm and the magnetic assembly for actuating the same are constructed and arranged so as to provide an assembly which is not only relatively thin but may also present a labyrinth type of dust shield for the diaphragm actuating means. The frame further incorporates built-in centering and spacing tooling which is removed following manufacture.

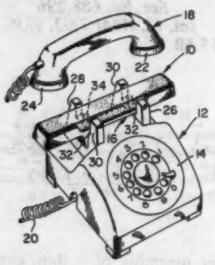
3,573,397
ACOUSTIC DIAPHRAGM AND TRANSLATING DEVICE UTILIZING SAME
Joseph A. Sawyer, and George C. Tibbetts, Camden, Maine assignors to Tibbetts Industries, Inc., Camden, Maine
Filed May 16, 1967, Ser. No. 638,926
Int. Cl. H04r *7/20*
U.S. Cl. 179—115 **7 Claims**



An acoustic diaphragm means for a translating device comprises a diaphragm portion and a surround therefor, a flexural pivot pin that extends substantially perpendicular to the diaphragm portion and attaches the diaphragm portion to the translating device near one edge of the diaphragm portion, and means for connecting another portion of the diaphragm portion to the vibratable element of the translating device, away from the center of pressure of the diaphragm means. The diaphragm utilized with a translating device, such as a magnetic type having a vibratable armature, provides a very high degree of acoustic compliance which

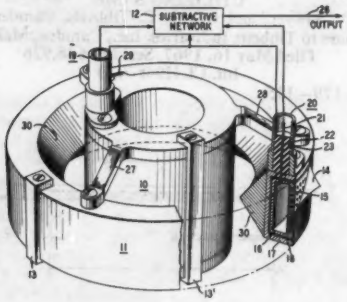
enables the armature to be made thicker, and also permits the diaphragm to be connected to the armature other than at the midpoint of the diaphragm so that the diaphragm may be of a size to more fully use the available area.

3,573,398
SOUND SUPPRESSION DEVICE FOR TELEPHONE
Thomas S. Kulka, 200 Film Building, 2108 Payne Ave., Cleveland, Ohio
Filed Jan. 31, 1968, Ser. No. 702,074
Int. Cl. H04m *1/14*
U.S. Cl. 179—146 **8 Claims**



Sound suppression devices for suppressing the pick up and transmission of voices or noises in the vicinity of the telephone handset when the same is in a position hung up on the telephone base. In all of the various illustrated forms of the invention, means formed on or associated with the handset and/or base absorb voices in the vicinity and inhibit the same from reaching the transmitter section of the handset, without, however, in any way detracting from the normal use of the telephone.

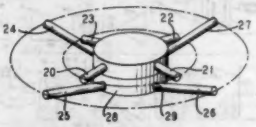
3,573,399
DIRECTIONAL MICROPHONE
Manfred R. Schroeder, Mountainside; Gerhard M. Sessler, Summit, and James E. West, Plainfield, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Aug. 14, 1968, Ser. No. 752,559
Int. Cl. H04r *1/40*
U.S. Cl. 179—121 **10 Claims**



A directional microphone with toroidal or truncated toroidal sensitivity characteristics is constructed from a plurality of concentric transducer elements, the outputs of which are combined in accordance with a predetermined formula.

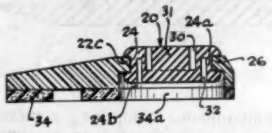
3,573,400
DIRECTIONAL MICROPHONE
Gerhard M. Sessler, Summit, and James E. West, Plainfield, N.J., assignors to Bell Telephone Laboratories, Inc., Murray Hill, N.J.
Filed Aug. 14, 1968, Ser. No. 752,560
Int. Cl. H04r *1/32*
U.S. Cl. 179—121 **10 Claims**

A directional microphone with toroidal sensitivity characteristics which can be selectively distorted is constructed with an arrangement of acoustic tubes which sample an acoustic field at a number of separated points on an inner circle and at separated points on a concentric outer circle. The acoustic signals from the inner points are summed in a first acoustic cavity and the signals from the outer points are summed in a second cavity. The first and second cavities are separated by a foil electret or other electroacoustic



transducer which produces a signal proportional to the difference in sound pressure between them. Several of the acoustic tubes may be adjusted to alter the shape of the microphone's sensitivity pattern in the plane of maximum sensitivity and the entire acoustic system is selectively dimensioned to equalize the system's inherent frequency response.

3,573,401
MICROPHONE STAND
Thomas C. Lininger, New Buffalo, Mich., assignor to Electro-Voice, Incorporated, Buchanan, Mich.
Filed Feb. 21, 1968, Ser. No. 707,222
Int. Cl. H04m *1/04*
U.S. Cl. 179—147 **3 Claims**

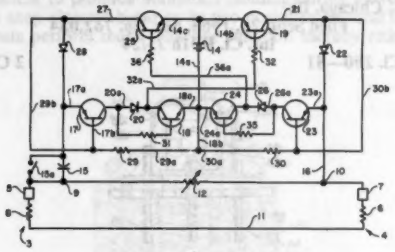


This application discloses a mount for a microphone in which a circular elastomeric body has an annular groove on one side to receive an annular portion of a microphone clamp assembly by simply pushing the annular portion of the assembly into the annular groove. The elastomeric body has a continuous groove in its periphery which engages the edge of a correspondingly dimensioned opening in the base of a microphone stand. A groove is also placed on the opposite side of the elastomeric body to improve shock and vibration isolation. The combination of the clamp assembly, elastomeric body, and the base provides the microphone stand.

3,573,402
BIDIRECTIONAL ADDITIVE AMPLIFIER
Charles W. Chambers, Jr., Amherst, Ohio, assignor to Lorain Products Corporation
Filed Mar. 25, 1969, Ser. No. 810,185
Int. Cl. H03f *3/62*
U.S. Cl. 179—170 **7 Claims**

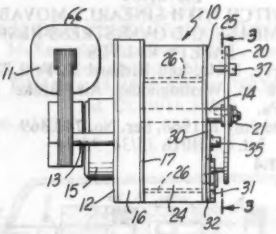
An electrical, two-terminal, bidirectional amplifier circuit which senses the direction of flow of a signal current through an ancillary source-load loop in which current flow may be bidirectional, to insert a boost voltage additively in series aiding relationship with the signal current irrespective of the direction of current flow in that source-load loop and then senses the instantaneous state of the signal current to control the magnitude of the added power. The amplifier is insensitive to the direction of transmitted intelligence through the source-load loop by the signal current and inserts

the boost voltage additively as required, in the face of the interchange of position of the sources and receivers of



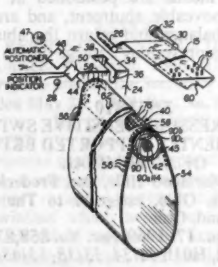
intelligence with respect to the amplifier terminals as, for instance, in telephone circuitry.

3,573,403
SKIP-A-DAY MECHANISM FOR ELECTRICAL TIMER SWITCH
William M. Poschman, II, North Las Vegas, Nev., and Lorna D. Poschman
Filed Feb. 12, 1970, Ser. No. 010,878
Int. Cl. H01h 7/08, 43/10
U.S. Cl. 200—38 5 Claims



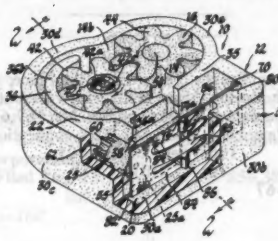
An electric switch and an electric motor with gear reduction unit for driving a switch actuating mechanism to close and open the switch at predetermined times each day. A skip-a-day mechanism for blocking switch operation on a selected day or days of the week. A pivoting plate yoke driven by the motor output wheel to actuate the switch. A pair of discs rotating together, with one disc being driven a step each day by the motor output wheel, and with the other disc controlling the position of a switch blocking lever by selectively positioned notches.

3,573,404
PROGRAMMABLE AUTOMATIC SELECTOR SWITCH
Daniel E. Robinson, 38 Orchard St., Metuchen, N.J.
Filed Apr. 17, 1969, Ser. No. 817,027
Int. Cl. H01h 43/08
U.S. Cl. 200—46 15 Claims



A selector switch for testing multiconductor cables, such as telephone cable. A contact board has a separate terminal connected with each conductor of the cable. A selector drum rotates under conductors on the contact board which are connected with the separate terminals of the contact board and the selector drum has contacts that pass across the conductors of the contact board to close circuits when not prevented from doing so by a belt that covers the drum. Perforations in the belt are located in positions to permit contact of different conductors and groups of conductors in accordance with a sequence which is programmed by the locations of the perforations in the belt.

3,573,405
MOTION DETECTION SWITCH
Kenneth R. Skinner, Bloomington, Ill., and David P. Clayton, Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.
Filed Nov. 18, 1969, Ser. No. 877,701
Int. Cl. H01h 35/40
U.S. Cl. 200—61.39 8 Claims

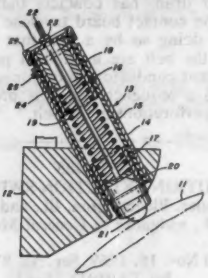


In a preferred form, a compact motion detecting switch mechanism for detecting movement of an automotive vehicle and which is operable to control operation of an electrical device or devices of the vehicle when the latter is moving and/or stopped is provided. The motion detecting switch mechanism comprises a housing means containing a liquid and which has a pumping chamber having an inlet for ingress of fluid and an outlet for egress of fluid, a rotary pump means disposed within the pumping chamber and which is adapted to be drivingly connected with a moving part of the vehicle for pumping liquid under pressure from the inlet toward the outlet, a switch means carried by the housing and which is adapted to be operatively connected with the electrical device or devices, a recirculating passage in the housing means for recirculating the liquid from the outlet toward the inlet of the pumping chamber, and a combined switch actuator and valve means slidably supported by the housing means for respectively controlling actuation and deactuation of the switch means and for controlling communication between the recirculating passage and the inlet of the pumping chamber. The combined switch actuator and valve means and housing of the switch mechanism are constructed and arranged such that the switch is actuated prior to the establishment of communication between the recirculating passage and the inlet of the pumping chamber.

3,573,406
CONTACT SENSOR ADAPTED TO BE ENGAGED BY TRAVELING ARTICLES OF ELECTRICALLY CONDUCTING MATERIAL
Charles J. Neuhoff, Upper Yoder Township, Cambria County, Pa., assignor to United States Steel Corporation
Filed Apr. 3, 1969, Ser. No. 813,266
Int. Cl. H01h 3/16
U.S. Cl. 200—61.41 3 Claims

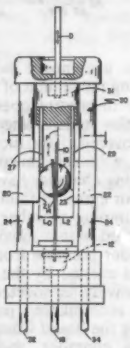
A contact sensor adapted to be engaged by traveling articles of electrically conducting material includes a tube of such material set in a grounded metal post and projecting therefrom so as to ensure such engagement. A sleeve of electrically insulating material secured in the tube extends outwardly beyond the end thereof opposite that which the articles approach. A spring-extended plunger anchored to sleeve has a head extending into the path of the articles for engagement thereby. A through bolt secures the plunger to

the sleeve and slides in a cap of insulating material secured over the end of the sleeve. The head is grounded on



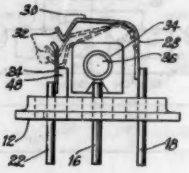
engagement by an approaching article and a circuit through the bolt is completed to energize a control relay or contactor.

3,573,407
SWITCHING
Lyndon Walkup Burch, Three River St Place, and Hadley Keyes Burch, Boston, Mass. (Pittsfield, Vermont 05762)
Continuation-in-part of application Ser. No. 567,633, July 25, 1966, now Patent No. 3,436,501. This application Oct. 10, 1968, Ser. No. 766,401
Int. Cl. H01h *15/18*
U.S. Cl. 200—67 **12 Claims**



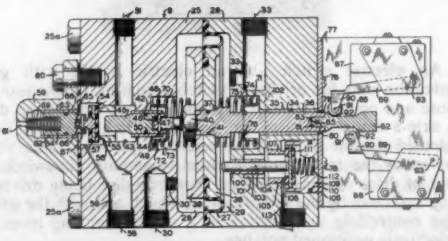
A snap-action switch comprising a snap member carrying a first electrical contact connected to a first electrical contact connected to a first electrical terminal which can be snapped through an unstable center position by pressure applied through the contact, a stationary second electrical contact connected to a second electrical terminal and engaged by the first contact when the snap member is in a first stable position, a wedging member mounted for sliding movement along the stationary second contact between it and the first contact upon application of an actuating force, this wedging member being sized to push the first contact away from the second contact by means of an electrically conducting portion maintaining electrical current flow between the first contact and the stationary contact, until the snap member snaps through its unstable center position, and means for snapping the member back to the second contact; and an actuating structure, for actuating a snap member as described between two stationary contacts, comprising a first wedging member which slides between the stationary second contact and the first contact on the snap member to push the first contact away until the snap member snaps over, and a second wedging member which slides between the stationary third contact and the first contact, with return actuator movement, to push the snap member contact back against the stationary second contact, these wedging portions being spaced apart from each other to provide clearance for the snap member contact in its snap movements. In a preferred embodiment, these wedging members are conductive wires.

3,573,408
SELF-LOCKING THREE POSITION PRESSURE OPERATED SWITCH CONSTRUCTION
Guy M. Farrell, Elmhurst, Ill., assignor to Chicago Switch, Inc., Chicago, Ill.
Filed Sept. 24, 1968, Ser. No. 762,054
Int. Cl. H01h *35/24*
U.S. Cl. 200—81 **2 Claims**



A pressure-operated switch comprising a movable contact for bridging separate contact portions and pressure applying means for engaging the movable contact. Under certain pressure conditions, the movable contact moves to a first position into engagement with an edge defined by a separate contact portion. A change in pressure will cause the movable contact to move away from this edge. In a preferred form of the invention, a movable contact defines a lip which latches onto an edge of the separate contact for retaining the movable contact in a contact-engaging position. When pressure is applied, the engagement between the lip and the edge is broken to provide an open position of the switch.

3,573,409
PRESSURE SWITCH WITH LINEARLY MOVABLE CAN-ACTUATING MEANS AND OVERSTRESS-RESPONSIVE SAFETY VALVES
William B. Jeffrey, Irwin, and Richard K. Frill, Pittsburgh, Pa., assignors to Westinghouse Air Brake Company, Wilmerding, Pa.
Filed July 1, 1968, Ser. No. 741,369
Int. Cl. H01h *35/34, 35/24*
U.S. Cl. 200—81.4 **2 Claims**

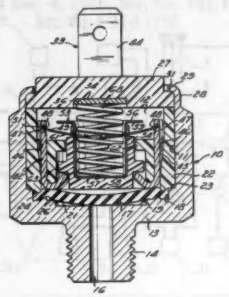


A pneumatically operated master controller switch device embodies therein a pair of snap-acting switches for effecting respectively energization and deenergization of a pair of magnet valve devices via a corresponding one of a pair of wires accordingly as one or the other of the switch devices is actuated by a minimum of movement of a movable abutment in response to variations in the fluid pressure on one side thereof with respect to the fluid pressure present on the other side. Safety valve means are positioned at each end of movement of the moveable abutment, and are actuated to restore a pressure balance and return the abutment to the neutral position, thus preventing damage due to overstress.

3,573,410
SNAP ACTION PRESSURE SENSITIVE SWITCH WITH SNAP DISC RESILIENTLY SUPPORTED BETWEEN LEGS OF A TERMINAL
Tadeusz Budzich, Moreland Hills, and Frederick D. Keady, Cleveland Heights, Ohio, assignors to The Weatherhead Company, Cleveland, Ohio
Filed Sept. 17, 1969, Ser. No. 858,832
Int. Cl. H01h *35/34, 13/38, 13/48*
U.S. Cl. 200—83 **11 Claims**

A pressure-operated switch is disclosed in which one switch contact is supported by an elongated bistable snap

element. The snap element is mounted on cantilever springs urging the ends of the element toward each other causing the element to bend with a single node. The spring loading is insufficient to produce multinode bending during movement of the snap element between its two positions. Several of the elements perform more than one function thereby reducing



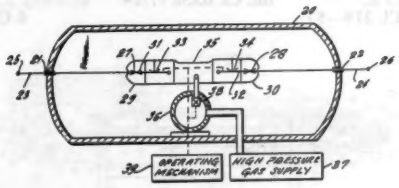
the number of elements required for the assembled device. For example, one terminal element functions to support the snap element, limit the plunger travel in one direction, and provide support for the diaphragm. Similarly, a spring functions to connect the other terminal to one contact element and to resiliently bias the plunger in one direction.

3,573,411

LIVE TANK HIGH VOLTAGE GAS CIRCUIT BREAKER

Daniel H. McKeough, Pasadena, Calif., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed Aug. 15, 1968, Ser. No. 752,959
Int. Cl. H01h *33/80*
U.S. Cl. 200—148 **6 Claims**



A high voltage gas blast circuit breaker wherein a relatively low-pressure chamber containing interrupter structures is mounted on a smaller relatively high-pressure chamber. The high- and low-pressure chambers are connected to one another through a valve which is mechanically connected to the interrupter contacts. The interrupter chambers may be colinear, or may be arranged in a V-type configuration to conserve lateral space for the low-pressure tank. The interrupters are arranged together as a three-phase interrupter with supporting insulator columns and bracing insulator columns transmitting gas and operating movement from ground positions.

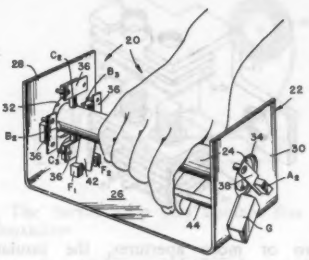
3,573,412

NATURAL RESPONSE MANIPULATOR APPARATUS

Richard W. Uhrich, Pasadena, Calif. The United States of America as represented by the Secretary of the Navy.

Filed May 26, 1969, Ser. No. 827,596
Int. Cl. H01h *21/00*
U.S. Cl. 200—157 **8 Claims**

A natural response manipulator apparatus which includes a controller and a responsive manipulator. The controller includes a support means; a generally tubular handle; and a plurality of switches which are mounted on the support means and which solely support the handle thereon so that the handle has floating action. The manipulator may include a simulated human arm which has its various components powered by a plurality of bidirectional power units. The power units may be controlled by the switches of the controller and may be connected to the various components of the simulated human arm so that the arm performs natural



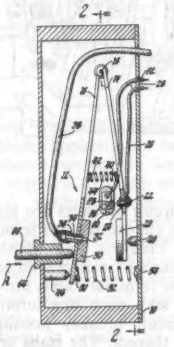
movements which correspond to hand-control of the controller.

3,573,413

PUSHBUTTON ACTUATED SWITCH WITH FLUIDIC MEANS CREATING A BERNOULLI EFFECT AND RESULTING IN MOMENTARY ACTION

Nathaniel B. Kell, Indianapolis, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 15, 1969, Ser. No. 850,388
Int. Cl. H01h *13/50*
U.S. Cl. 200—160 **4 Claims**



A fluidic switch having a pair of separately pivotable spring separated arms each having a flat plate secured thereto. The arms are moved to a substantially parallel position, by a pushbutton, so that fluid introduced centrally through one of the plates creates a fluid flow attraction between the plates sufficient to overcome the spring load. A second spring moves the arms in unison, when the force on the pushbutton is released, until an electric contact on one arm is abutting a stationary electrical contact at which time both springs oppose and overcome the fluidic attraction thereby separating the plates and opening the electrical contacts.

3,573,414

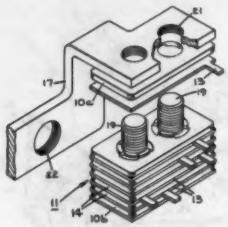
SWITCH PILE-UPS

James D. Brandlein, and Joseph D. Mathis, Indianapolis, Ind., assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed Apr. 14, 1969, Ser. No. 815,710
Int. Cl. H01h *9/02*
U.S. Cl. 200—166 **6 Claims**

A molded plastic insulator for use in switch pileups, has a plurality of arcuate, self-locking peripheral recesses and projections alternately surrounding the apertures formed

therein. The number and orientation of the recesses and projections are chosen in such a manner that even when they



surround two or more apertures, the insulators are symmetrical from an interlocking standpoint when stacked.

3,573,415

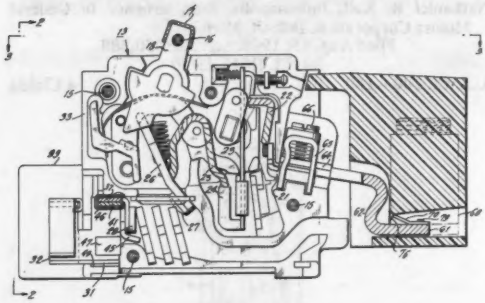
PARALLEL POLE CIRCUIT BREAKER

Carl E. Gryctko, Haddon Heights, N.J., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed Nov. 7, 1969, Ser. No. 874,776

Int. Cl. H01h *9/02*

U.S. Cl. 200—168 **10 Claims**



Four single-pole circuit breakers are stacked side by side with an internal strap connecting line terminals of a first pair of adjacent circuit breakers and another internal strap connecting line terminals of a second adjacent pair of circuit breakers. A single line terminal stab is provided for each pair of circuit breakers, with each line terminal stab having a portion inside a circuit breaker housing and a portion extending externally thereof. The stabs are spaced apart by the center-to-center distance between adjacent pole units to engage differently phased cooperating stabs in a panelboard. The load terminals of each pair of circuit breakers are electrically connected and are provided with a single wire grip positioned in alignment with the abutting surfaces of the circuit breakers in each pair. The wire grip housing is secured by a snap-on-type connecting means and is disposed so as to prevent tampering with the load terminal connections of the individual circuit breakers.

3,573,416

METHOD AND DEVICE FOR SELF REGULATED WELDING IN THE MANUFACTURE OF LONGITUDINALLY WELDED METAL TUBES

Guido Drechsler, Reutlingen, Germany, assignor to Dalmine SPA, Milan, Italy, fractional part interest

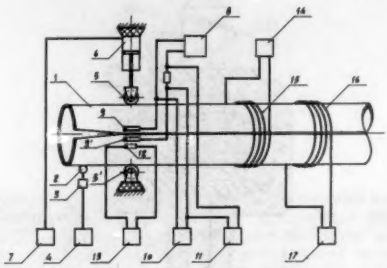
Filed Sept. 24, 1969, Ser. No. 860,681

Claims priority, application Germany, Sept. 28, 1968, Nov. 9, 1968, Nov. 16, 1968, May 21, 1969, P 17 90 205.5, P 18 08 074.5, P 18 09 287.0, P 19 25 865.2

Int. Cl. B23k *13/02*

U.S. Cl. 219—8.5 **12 Claims**

A method according to which the most important quantities in the manufacture of welded metal tubes, i.e. feeding speed of the metal band, upsetting pressure, intensity of the whole welding current, intensity of the so called back current, applied voltage and temperature of the welding seam, are continuously electrically measured and the measured values are correlated to each other obtaining a plurality of quotients which are compared with prefixed



quotients corresponding to optimal welding conditions; the electrical value resulting from said comparison starts a self regulating process of the concerned quantities in order to reach again said prefixed quotients.

3,573,417

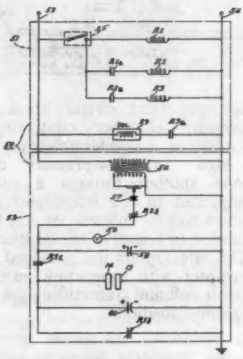
WELDING PACK AND METHOD OF WELDING SMALL WORK PIECES

Walter J. Draving, Willow Grove; Robert C. Draving, Fort Washington, and Alexander Patton, Jr., Philadelphia, Pa., assignors to Micro-Miniature Parts Corporation, Willow Grove, Pa.

Filed Sept. 29, 1967, Ser. No. 671,798

Int. Cl. B23k *11/24*

U.S. Cl. 219—57 **6 Claims**

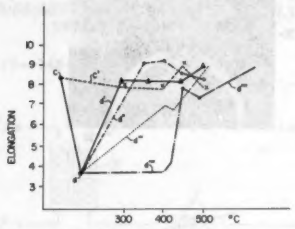


A method and apparatus for effecting welds in small work pieces by electrical resistance butt welding. The circuit or pack employed includes an AC to DC converter, the variable DC output of which is connected to first capacitive means. Switch means are provided for connecting the capacitive means to the workpiece holders, and a second capacitive means shunts the holders and thereby the work pieces when they come into engagement. Just prior to engaging the work pieces in abutting end-to-end relation the first capacitive means is connected to the holders and therefore to the shunt capacitor whereby at least a portion of the charge held by the first capacitive means bleeds into the second capacitive means prior to the weld being effected.

3,573,418
METHOD OF PRESERVING MECHANICAL PROPERTIES OF STEEL WIRE DURING SPOT WELDING

Tatuo Amakasu, Tokyo, and Takao Yamazaki, Fujisawa-shi, Japan, assignors to Koushuha-netsuren Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 4, 1968, Ser. No. 781,174
Int. Cl. C21d 1/30
U.S. Cl. 219—58 4 Claims

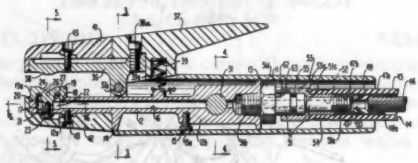


A method for preserving the mechanical properties of steel wire or rod during spot welding of such steel wire or rod to form cages for use in prestressed concrete. The steel reinforcing rods are heated to a temperature of from 300—450° C. for from 5 seconds to 15 minutes after being spot welded.

3,573,419
CUTTING AND GOUGING TORCH

Harold R. Henderson, Lancaster, Ohio, assignor to Arcair Company, Allentown, Pa.

Filed Oct. 16, 1968, Ser. No. 768,044
Int. Cl. B23f 9/00; B23k 9/28
U.S. Cl. 219—70 16 Claims



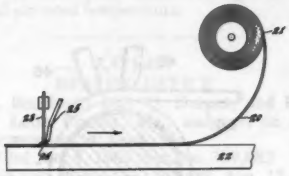
This invention involves an improved design of the air-carbon arc type of cutting and gouging torch in which an elongated electrode is gripped by an electrode clamp with a portion of the electrode length exposed and projecting freely toward the workpiece so an arc may be struck and maintained between the electrode tip and the work and a nozzle connected to a source of high pressure gas, preferably air, disposed immediately adjacent where the electrode is gripped to direct a stream of gas along one side of the exposed length of the electrode toward its tip substantially parallel to the axis of the electrode to blow molten metal of the workpiece from beneath the arc.

3,573,420
PROCESS AND APPARATUS FOR NONCONSUMABLE ELECTRODE OVERLAY WELDING

Wallace C. Johnson, Wilmington, N.C., assignor to Arcos Corporation, Philadelphia, Pa.

Filed Dec. 23, 1968, Ser. No. 786,236
Int. Cl. B23k 9/04
U.S. Cl. 219—76 5 Claims

Electric arc overlay welding, often called arc cladding, on a metallic backing, which in many cases is of steel. A barrier strip rests on the backing and a nonconsumable electrode arcs to the barrier strip. In one form of the invention the nonconsumable electrode oscillates back and forth across the barrier strip as it moves forward and in some cases it goes beyond the barrier strip and arcs to a previous weld bead beside the barrier strip. In one form of the invention the barrier strip is of green or unsintered compacted metal

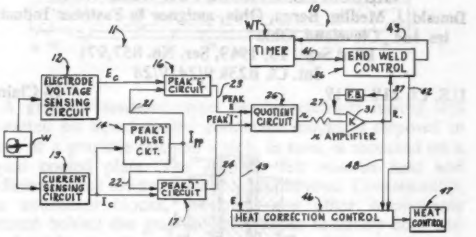


particles. The barrier strip may contain flux and it may contain deoxidizer.

3,573,421
QUOTIENT CIRCUIT

Peter W. Vanderhelst, Livonia, Mich., assignor to Robotron Corporation, Detroit, Mich.

Filed July 3, 1967, Ser. No. 650,715
Int. Cl. B23k 9/10
U.S. Cl. 219—110 14 Claims



A resistance drop feedback welding control circuit is disclosed which includes apparatus for detecting the effective instantaneous resistance across the welding position of a resistance welding machine from the electrode voltage and welding current. A method of detecting the effective instantaneous resistance from the electrode voltage and welding current is also disclosed. Means are provided for producing pulses in concurrence with peaks of the welding current waveform. Further means controlled by these pulses sample the electrode voltage and welding current at the welding current peaks. A quotient circuit produces a high frequency pulse train in which the pulse amplitude is proportional to the peak electrode voltage amplitude and the pulse duration is inversely proportional to the peak amplitude of the welding current. The quotient circuit includes means for averaging the amplitude of the high frequency pulse train to provide a DC output proportional in magnitude to the contact resistance at the welding position.

3,573,422
METHOD OF ELECTRICALLY WELDING A CONTACT TO A RESISTANCE WIRE

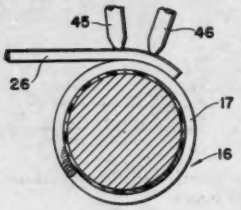
Jack E. Langenbach, Corona Del Mar; James E. McAdoo, Santa Ana, and Paul L. Pataky, Anaheim, Calif., assignors to Beckman Instruments, Inc.

Original application Oct. 10, 1961, Ser. No. 144,251, now abandoned. Divided and this application June 7, 1965, Ser. No. 473,266
Int. Cl. B23k 11/20; H01c 17/00
U.S. Cl. 219—118 3 Claims

CLAIM 3. method of manufacturing electrical resistance elements comprising the steps of:

winding a plurality of turns of bare, resistance-type wire onto an insulated core, said wire having a predetermined melting point; fabricating a termination tab from a material having a melting point substantially higher than the melting point of said wire, said tab being of sufficient width to span a plurality of turns of said wire; placing

said tab transversely across said core with a portion thereof in intimate contact with a plurality of turns of said wire; and supplying electrical energy to said tab by



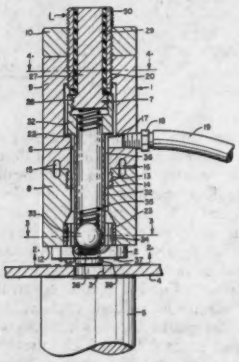
electrodes at opposite sides of said portion to heat said tab and fuse said wire onto said tab at said portion between said electrodes.

3,573,423

VACUUM ELECTRODE FOR WELD NUTS

Donald J. Medlin, Berea, Ohio, assignor to Fastener Industries, Inc., Cleveland, Ohio

Filed Sept. 15, 1969, Ser. No. 857,971
Int. Cl. B23k *9/24, 9/28*
U.S. Cl. 219—119 **15 Claims**



An electrode for attaching weld nuts and the like to a workpiece, such as a steel sheet, in which an electrode body has a bore extending inwardly from an end face and pilot-positioning means is adjustably mounted in the bore to adapt the electrode for weld nuts of varying sizes. The electrode bore can be evacuated so that, in combination with the pilot-positioning means, a weld nut is retained by the vacuum against the end face of the electrode in suitable welding position.

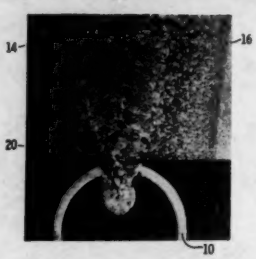
3,573,424

METHOD FOR REMOVAL OF THE POROUS PORTION OF A BUTT WELD

Phillip F. Macherey, Bethel Park, Pa. assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed July 23, 1969, Ser. No. 844,115
Int. Cl. B23k *15/00*
U.S. Cl. 219—121 **1 Claim**

A method for butt welding with electron beams wherein an elongated or hollow cylindrical backup member is placed below the edges to be butt welded to receive the porous portion of the weld bead which backup member and porous portion which may be subsequently cut away without



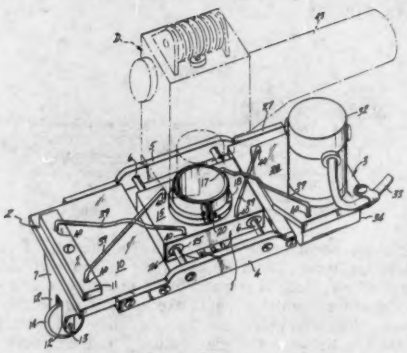
undercutting the work and without leaving remnants of the backup member on the work.

3,573,425

WELDING APPARATUS

Lloyd E. Damon, Wallingford, Conn., assignor to Olin Corporation

Filed July 30, 1969, Ser. No. 846,047
Int. Cl. B23k *9/12*
U.S. Cl. 219—125 **13 Claims**

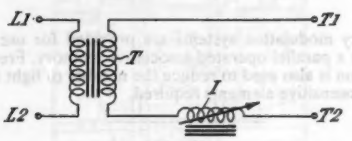


A semiautomatic welding apparatus which includes a guide wheel assembly, a welding gun carriage assembly and a drive wheel assembly joined together within one unit. The welding gun carriage assembly can be moved from side to side when a turning motion is applied to the welding gun handle. A gear and rack arrangement is used to move the welding gun carriage from side to side as the gun handle is turned. The guide wheel and drive wheel assemblies are pivoted on their axes which are essentially perpendicular to the seam being welded. Turning motion is supplied to these assemblies by tie rods which are attached to these assemblies and the welding gun carriage. By crossing these tie rods as an X, each assembly rotates on its axis in opposite directions, which allows the guide wheel and drive wheel to essentially follow the same path. The lateral movement of the welding gun carriage is proportional to turning moment of the guide and drive wheels with the result that the welding arc path follows the same path as the guide and drive wheels.

3,573,426
ARC WELDING

Paul Desmond Blake, Bishops Stortford; Roy Douglas Johnston, Braughing Ware; Brian Phelps, Roydon near Harlow; Edwin Albert Chapman, Cuffley, Potters Bar, and Ronald Leonard Bartlett, Cheshunt, England, assignors to Murex Welding Processes Limited, Waltham Cross Hertfordshire, England

Filed Aug. 18, 1967, Ser. No. 661,637
Claims priority, application Great Britain, Oct. 31, 1966, Nov. 1, 1966, Nov. 8, 1966, Mar. 15, 1967, Mar. 28, 1967, Apr. 5, 1967, Apr. 5, 1967, Apr. 10, 1967, 48640/66;48972/66;4992766;12186/67;13776/67;15579/67;15578/67;16380/67
Int. Cl. B23k *35/22*
U.S. Cl. 219—146 6 Claims



Process for the arc welding of mild steel workpieces without external shielding of the arc by the use of cored tubular electrodes which deposit weld metal of improved physical properties and containing 0.5—1.3 percent aluminum 0.3—2 percent manganese, 0.1—1 percent silicon, not more than 0.12 percent carbon, and not more than 0.2 percent titanium, the balance substantially iron.

3,573,427
ELECTRICALLY CONDUCTIVE ASPHALTIC CONCRETE

Louis David Minsk, Hanover, N.H., assignor to the United States of America as represented by the Secretary of the Army

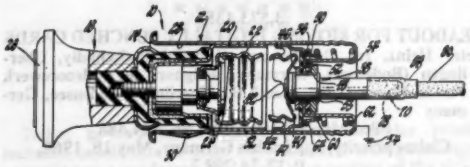
Filed July 30, 1969, Ser. No. 846,231
Int. Cl. H05b *3/60*
U.S. Cl. 219—213 5 Claims

The passage of an electric current through an electrically conductive asphaltic concrete surface generates sufficient heat within the surface to prevent the accumulation of snow and ice thereon. The asphaltic concrete is made electrically conductive by incorporating graphite particles within the concrete mix.

3,573,428
CIGARETTE LIGHTER WITH A FUSIBLE CIRCUIT BREAKER

Donald G. Dening, Rochester, and Jack P. Castellana, Churchville, N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 7, 1969, Ser. No. 864,314
Int. Cl. F23g *7/24*
U.S. Cl. 219—265 3 Claims



A cigarette lighter of the type having a manually removable igniting plug slidably received in the open end of a mounting case which includes a current inlet supply post for completing an igniting circuit between a heating element carried by the igniting plug and a connector from a current source. The current inlet supply post includes a fusible pin formed of a low-melting point alloy which melts by conductive heating so as to permanently interrupt the igniting circuit by releasing an end portion of the pin and the connector from said post when the lighter reaches a predetermined elevated temperature.

3,573,429
HEATING DEVICE

Frederick W. Brodbeck; Dick Q. Durant, and Richard D. Taylor, St. Louis County, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

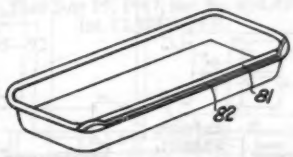
Filed Jan. 8, 1969, Ser. No. 789,683
Continuation-in-part of Ser. No. 301,488, Aug. 12, 1963, Pat. No. 3,296,415, which was a Continuation-in-part of Ser. No. 749,554, July 18, 1958, Pat. No. 3,100,711.
Int. Cl. F24h *9/02*
U.S. Cl. 219—343 14 Claims

A graphite resistance-type heating element having legs mounted on liquid cooled connector blocks is disposed in front of a graphite felt pad which, in turn, is mounted on a liquid cooled plate. The graphite felt absorbs heat and radiates it back toward its source and beyond. Consequently, the connector blocks, the plate and other components located behind the graphite felt remain relatively cool and need not be constructed from rectory materials.

3,573,430
SURFACE HEATING DEVICE

Paul Eisler, London, England

Filed Dec. 30, 1966, Ser. No. 607,601
Continuation-in-part of Ser. No. 301,488, Aug. 12, 1963, Pat. No. 3,296,415, which was a continuation-in-part of Ser. No. 749,554, July 18, 1958, Pat. No. 3,100,711
Int. Cl. F27d *11/00*
U.S. Cl. 219—385 4 Claims



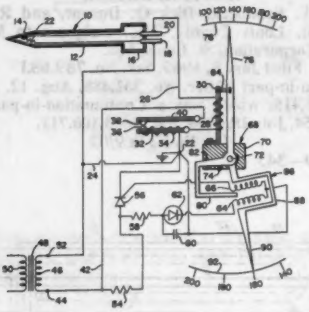
A dispensable container for a substance to be heated therein incorporates a low voltage surface pattern heating film with externally accessible terminals, the relative disposition of the film container and substance being such that the heat generated by the film does not exceed that dissipated into the substance by more than 4 watts per square inch, means also being provided to ensure that more heat reaches the substance than the external surface of the complete package.

There may be heat insulation between the container and its surface. The film may be of patterned metallic foil. There may be provision to supply heat from outside by radiation or conduction. There may also be provision for a small body of liquid between the film and substance, the liquid having access to a substantial area of the substance so that the temperature is limited to the boiling point of the liquid.

3,573,431
AUTOMATIC MEAT COOKING SYSTEM

Hugh J. Tyler, Santa Ana, and James R. Willson, Garden Grove, Calif., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Oct. 2, 1969, Ser. No. 863,275
Int. Cl. H05b *1/02*
U.S. Cl. 219—516 15 Claims

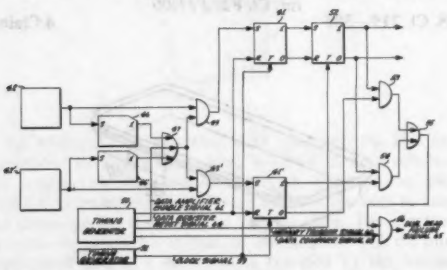


An automatic meat cooking system including a probe for sensing the internal temperature of a piece of meat, an indicator assembly including an internal temperature responsive member movable in response to temperature sensed by the probe to continuously indicate the actual internal temperature of the meat and a vane adapted to permit the triggering of a detecting circuit when the vane is in a predetermined position with respect to a temperature adjusting member such that the detecting circuit energizes a load to cool an oven from cooking temperature to holding temperature while anticipating the cooking of the meat during the cooling period.

3,573,432
SYSTEM FOR READING CODED INFORMATION FROM PUNCHED CARDS WITH AUTOMATIC ERROR DETECTION AND CORRECTION

David Murray, Phoenix, Ariz., and Kenneth D. Hulse, Glendale, Calif., assignors to General Electric Company

Filed Apr. 10, 1967, Ser. No. 629,570
Int. Cl. G06k *5/00*
U.S. Cl. 235—61.7 9 Claims



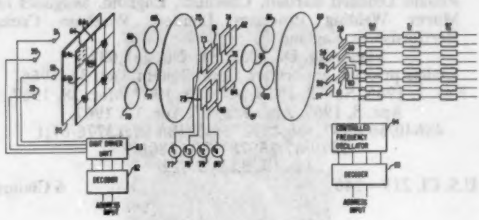
A logic control system energized by signals derived from punched cards which detects and corrects errors resulting from misread or damaged cards.

3,573,433
OPTICAL READ-ONLY MEMORY

Thomas J. Harris, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1968, Ser. No. 697,710
Int. Cl. G06k *9/04*; G11b *7/08*
U.S. Cl. 235—61.11 8 Claims

An optical read-only memory system for reading binary information from a film with transparent locations indicating bits. A plurality of lens systems are provided to successively divide the binary information from the film into smaller and more easily handled units of information. The system is adapted to be used also as an associative memory unit.

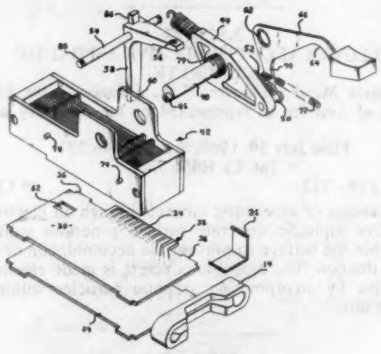


Frequency modulation systems are provided for use of the system as a parallel operated associative memory. Frequency modulation is also used to reduce the number of light sources and photosensitive elements required.

3,573,434
CARD READER

John Gleason Wallace, Shellsville, and Charles Michael Lovendusky, Enola, Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 28, 1968, Ser. No. 755,848
Int. Cl. G06k *7/01*
U.S. Cl. 235—61.11 7 Claims



A reliable, low cost card reader for reading credit cards. A simplified mechanism for actuating the card reading head comprises a spring toggle arrangement which is released when a credit card is inserted into the reader. A manual lever resets the toggle arrangement to raise the reading head and eject the card. The mechanism utilizes a number of inexpensive stamped parts, and the design is such that assembly of parts is very easy and precise.

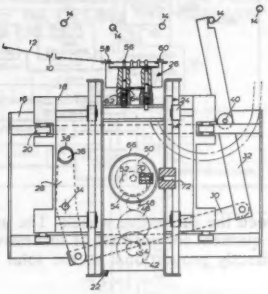
3,573,435
READOUT FOR MOVING DIGITALLY PUNCHED CARDS

Peter Heinz, Im Oschle, and Gerhard Podschadly, Uberlingen (Bodensee), Germany, assignors to Bodenseewerk Perkin-Elmer & Co. G.m.b.H., Uberlingen/Bodensee, Germany

Filed May 14, 1969, Ser. No. 824,488
Claims priority, application Germany, May 18, 1968, P 17 74 298.2
Int. Cl. G06k *7/015, 13/06*
U.S. Cl. 235—61.11 6 Claims

A device for reading digitally stored data on, for example, a moving punched card (for example, by being carried along by a rotating turntable, which may be part of an automatic chemical analysis instrument). A reading or scanning device, including a series of pins for finding each of the holes in the punched card, is mounted for both movement toward and

away from the card (so as to initiate and terminate reading of the card) and movement generally parallel to the card movement direction. The latter movement is controlled by coupling (as by a lever system and pin connection) to movement of the turntable, supporting the punched card; and additional positive locating means (such as pinlike guide bars) directly couple the scanning device to the punched card support during the reading operation. Each of the



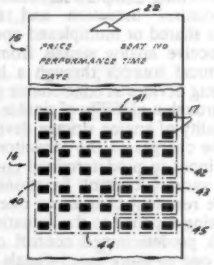
individual pins that "finds" a hole closes one of a group of electrical contacts, each of which is supplied an appropriate number of pulses (equal to the digital "value" of that particular hole location) by a pulse generator (which may comprise a "light gate" and a digital interrupting means, such as a series of holes in a revolving drum). Thus, the device scans a moving record medium, such as a card with punched holes, without any risk of substantial misalignment of the scanning device (i.e., the pins) relative to the moving card.

3,573,436

METHOD AND APPARATUS FOR READING TICKETS, AND TICKET FOR USE THEREWITH

Robert M. Berler, Westport, Conn., and Norman Alpert, Scarsdale, N.Y., assignors to Pitney Bowes-Alpex Inc., Danbury, Conn.

Filed Oct. 8, 1968, Ser. No. 765,771
Int. Cl. G06k *19/06, 7/14*
U.S. Cl. 235—61.12N **2 Claims**



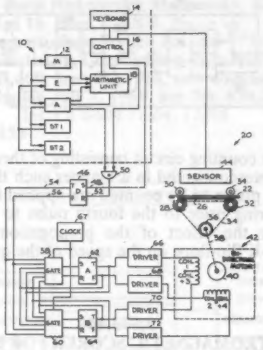
Ticket printed by a conventional computer printer includes, in addition to usual information, markings arranged according to a predetermined code on a portion of the ticket in rows and columns. The greatest possible number of markings per inch in each row and column are related to the number of characters per inch in each row and column, respectively, printed out by the computer printer. The ticket is read by advancing it at constant speed past a means, such as a bank of photoelectric cells equal in number to the number of columns of markings, capable of producing an electric signal in response to sensing the markings.

3,573,437

BI-DIRECTIONAL CARD READING SYSTEM

Thomas J. Scuitto, Malibu, and William B. Newby, Los Angeles, Calif., assignors to Wyle Laboratories, El Segundo, Calif.

Filed June 4, 1968, Ser. No. 734,275
Int. Cl. G06k *7/14;* **G11b** *5/48*
U.S. Cl. 235—61.11 **4 Claims**



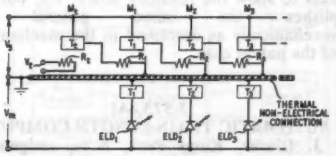
A system for use in conjunction with a digital calculator for reading program cards or other indicia bearing records. The system includes a transport mechanism capable of selectively moving a card in opposite directions. Data on the card defines a sequence of calculator instructions. Reading means sequentially reads the instructions as the card is moved in a forward direction to thus cause the calculator to execute the operations identified by the instructions. Means are provided responsive to conditional and unconditional branch instructions for reading the instructions out of sequence. For example, in response to a CONDITIONAL REWIND instruction and the content of one of the calculator registers, the card is moved in a reverse direction until a FORWARD instruction is sensed.

3,573,438

THERMALLY CONTROLLED OPTOELECTRONIC DISPLAY DEVICE

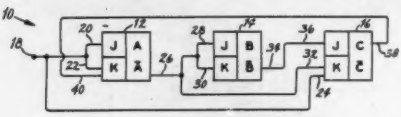
John H. Rowen, Florham Park, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed July 19, 1967, Ser. No. 654,429
Int. Cl. H03k *23/02*
U.S. Cl. 235—92 **2 Claims**



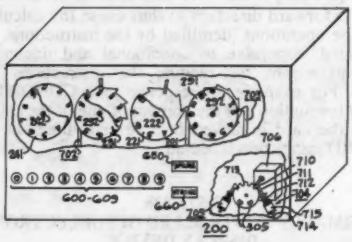
A shift register includes a plurality of modules connected in parallel, each of the modules comprising a variable resistivity element disposed adjacent to a heating resistor. In order that a pulse propagate from one module to the next, the heating resistor of each module is made responsive to the state of the variable resistivity element of the next preceding module. The shift register has application as a scanner for optoelectronic display panels.

3,573,439
HIGH SPEED QUINARY COUNTER
Ronald G. Myers, Parsippany, N.J.; Harvey Bidner, Plainview, N.Y., and Reinholdt J. Eufinger, Jr., Morris Plains, N.J., assignors to Monsanto Company, St. Louis, Mo.
Filed May 1, 1968, Ser. No. 725,666
Int. Cl. H03k 23/24
U.S. Cl. 235—92 2 Claims



A quinary counting circuit consisting of three J-K flip-flops which are interconnected in a manner such that the flip-flop to which all pulses to be counted are applied is inhibited by a pulse occurring prior to the fourth pulse to be counted. In this manner the effect of the propogation delays of the individual J-K flip-flops on the speed of the quinary circuit is minimized.

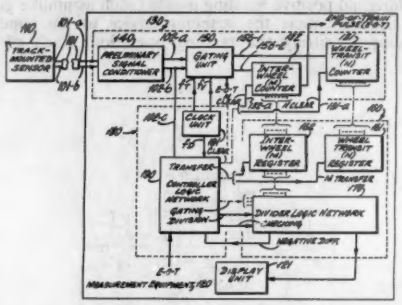
3,573,440
ELECTROMAGNETIC SCORER FOR BOWLING
Harry A. McClister, Deceased, Late of Morrisville, Pa., Ruth W. McClister, Executrix, 91 N. Delmarr Ave., Morrisville, Pa., and The Fidelity Bank, Coexecutor, Philadelphia, Pa.
Continuation-in-part of application Ser. No. 577,293, June 13, 1966, now Patent No. 3,406,902, dated Oct. 22, 1968. This application Oct. 18, 1968, Ser. No. 768,939
Int. Cl. G06m 3/06
U.S. Cl. 235—92 4 Claims



A scorer for bowling comprises scorekeeping wheels for units, tens, and hundreds, a frame-counting wheel, and a memory device. The player is informed of the infrequent situation in which he must score the first fall of a frame. The player actuates buttons corresponding to strikes, spares, or a knock down of less than 10 pins, and an electrical method utilizing the McClister instant scoring mathematics actuates the wheels to show the resulting score. The button-pushing accomplishes the same general sequences electromechanically as described in the mechanical type of scorer of the parent case.

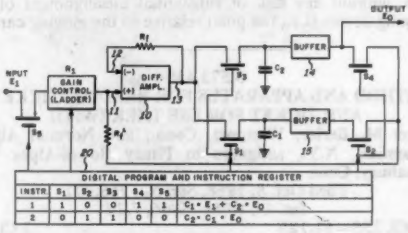
3,573,441
AUTOMATIC TRAIN LENGTH COMPUTER
Arthur J. Glazar, Kings Park, N.Y., assignor to Servo Corporation of America, Hicksville, N.Y.
Filed Aug. 29, 1968, Ser. No. 756,113
Int. Cl. G06f 15/48; G06g 7/78
U.S. Cl. 235—150.24 4 Claims

An apparatus for measuring the length of a moving railroad train is provided. The apparatus includes two sensors mounted on a rail of the track in relatively close proximity to one another and two counting circuits, each of which is operatively connected to the sensors and counts the pulses from an associated fixed frequency pulse generator. The first counting circuit is enabled when a wheel passes the first sensor and disabled when that wheel passes the second sensor. The second counting circuit counts the pulses during the time interval between successive wheels passing one of the sensors. An arithmetic unit is also provided which computes the quotient of the counts of the first and second counting circuits. The quotient is directly proportional to the



distance between the successive wheels. The arithmetic unit also sums the quotient for each set of successive wheels and this sum is directly proportional to the total length of the train.

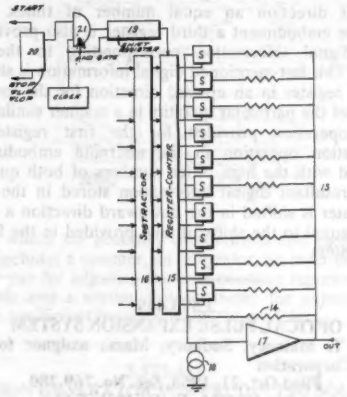
3,573,442
SAMPLED DATA HYBRID ANALOGUE-DIGITAL COMPUTER SYSTEM
Richard E. Andeen, Phoenix, Ariz., assignor to Sperry Rand Corporation
Filed June 16, 1967, Ser. No. 646,549
Int. Cl. G06j 1/11
U.S. Cl. 235—150.5 16 Claims



A hybrid analog-digital computer apparatus, particularly applicable in controlling complex servomechanisms such as aircraft flight control actuation and display systems, comprising a time shared or multiplexed operational amplifier adapted to receive analog signals from control system inputs and command sources through a large plurality of solid state switching devices at controllable gain levels and to supply outputs through a plurality of similar output switching devices to a plurality of analog storage devices, such as simple capacitors, the charges on the capacitors being fed back to the amplifier input in predetermined controlled manners for performing various control functions; the computer outputs being the resultant charges on one or more of said capacitors and being supplied to the actuation and/or display devices. Through predetermined control of the input and output switches, one or more input signals are selected and various computational operations thereon are performed as required for proper system control. The signals to be selected and the computations to be performed are under the control of a programmed digital memory, the sequential word and word bit outputs of which determine the sequence and orders respectively of switch operations and the signal gains required. The digital format of the program output and the high-speed operation of the solid-state switches provide extremely rapid sequencing of desired computations while the data always remains in analog form thereby retaining the precise resolution of analog computers while providing the high-speed capability of digital computers. Since all the computations are determined by the programmed memory, the computer is adaptable to control systems of widely

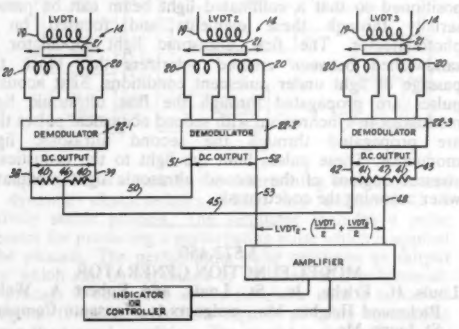
different characteristics and complexity merely by the addition or deletion of switches and storage capacitors and by inserting the proper program into the memory. Hence, in terms of aircraft automatic flight control, a truly "universal" flight control system.

3,573,443
DIGITAL-ANALOG RECIPROCAL FUNCTION COMPUTER-GENERATOR
Harry Fein, 832 Quarter Mile Road, Orange, Conn.
Filed July 9, 1968, Ser. No. 743,491
Int. Cl. G06g 7/16; G06j 1/00
U.S. Cl. 235—150.53 **7 Claims**



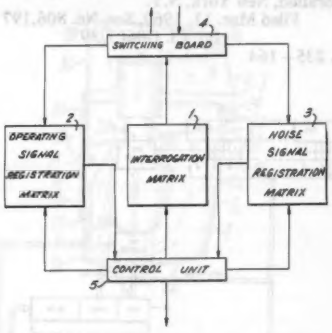
A hybrid circuit which may function as a digital to analog converter is disclosed. The invention comprises a combination of digital and analog circuit components which provide an analog output which is the reciprocal of a binary input signal. The invention may also be employed as a hyperbolic function generator by delivering digital input signals in consecutive order to the circuit.

3,573,444
GAGING CAMBER OF LENGTHWISE MOVING STRIP MATERIAL
James S. Kawabatá, Niles, and James E. Tudor, Jr., Des Plaines, Ill., assignors to Contour Saws, Inc., Des Plaines, Ill.
Filed June 4, 1969, Ser. No. 830,418
Int. Cl. G05d 5/00
U.S. Cl. 235—151.3 **9 Claims**



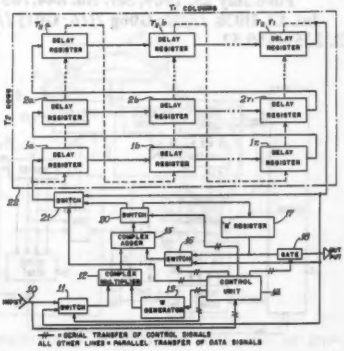
There is a feeler-equipped transducer for each of three equidistant fixed points on a line parallel and lengthwise adjacent to an elongated zone through which strip to be gauged moves lengthwise. Each transducer produces a continuous output corresponding in sign and magnitude to the distance between its point and an edge of the strip, measured in the direction of departures from straightness to be gauged. One-half the sum of the outputs corresponding to the outer points is subtracted from the output corresponding to the middle point to obtain a signal having a sign and magnitude representing camber.

3,573,445
DEVICE FOR PROGRAMMED CHECK OF DIGITAL COMPUTERS
Ludmila Alexandrovna Korytnaja, B. Kitaevskaja Str. 111/2, Apt 72, and Boris Nickoaevich Malinovsky, B. Kitaevskaja Str. 111/2, Apt 16, Kiev, U.S.S.R.
Continuation-in-part of application Ser. No. 771,844, Oct. 30, 1968, now abandoned , Continuation-in-part of application Ser. No. 449,409, Apr. 20, 1965, now abandoned. This application July 7, 1969, Ser. No. 839,209
Int. Cl. G06f 11/04, 11/06
U.S. Cl. 235—153 **4 Claims**



A programmed device for detecting faults in digital computers comprises an interrogation matrix ensuring activation of computer elements checked, an operating signal registration matrix that registers the operating signals arriving from the computer elements checked after their being activated by the interrogation matrix, a noise signal registration matrix, a unit for controlling said matrices, a switching board maintaining the connection between inputs of the computer elements checked and outputs of said interrogation matrix, and between outputs of the elements checked with inputs of said operating signal registration matrix and noise signal registration matrix.

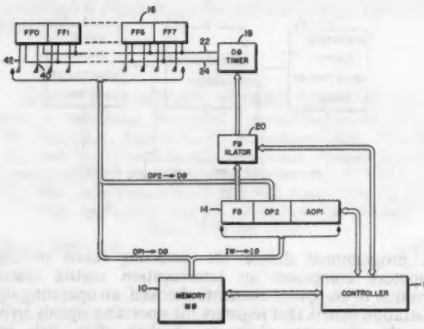
3,573,446
REAL-TIME DIGITAL SPECTRUM ANALYZER UTILIZING THE FAST FOURIER TRANSFORM
Glenn D. Bergland, Morristown, N.J., assignor to Iowa State University Research Foundation, Inc., Ames, Iowa
Filed June 6, 1967, Ser. No. 643,902
Int. Cl. G06f 7/38
U.S. Cl. 235—156 **5 Claims**



A digital signal processing system for computing the finite discrete Fourier transform coefficients from a number (N) of

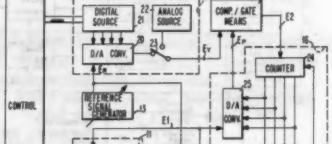
digitized samples of an input signal in real time. The signal being analyzed is sampled a predetermined number of times over a given interval, and this number of samples is expressed as the product of two integers, $N=r_1 \cdot r_2$. An array of delay registers is arranged in the form of a matrix having r_1 columns and r_2 rows. The delay registers are controlled so that the contents may be transferred either in a column shift mode or in a row shift mode. While shifting the contents of the array in the row shift mode, the system computes an intermediate set of spectrum estimates which are stored in the array. From this intermediate set, the final coefficients are generated while shifting the contents of the array in its column shift mode.

3,573,447
LOGICAL MULTIPLY SCHEME FOR BINARY COMPUTER
Gerald J. Erickson, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.
Filed Mar. 11, 1969, Ser. No. 806,197
Int. Cl. G06f 7/39
U.S. Cl. 235—164 **4 Claims**



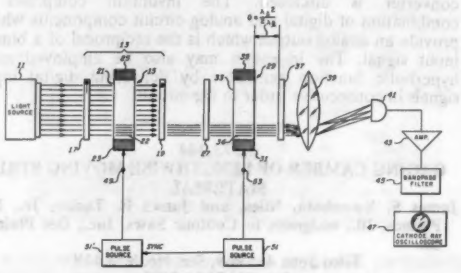
A scheme for performing a logical multiply operation in a computer using binary arithmetic and double-gated logic, i.e., both the input set and clear gates of the data register stages are simultaneously enabled, for data transfers into the data register. The scheme involves double gating a first operand into the data register and then transferring only the O bits of a second operand into the data register by enabling only the input clear gates of the data register stages. This operation achieves a logical multiply of the first and second operands.

3,573,448
HYBRID MULTIPLIER
Ralph D. Valentine, Owego, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed July 25, 1969, Ser. No. 844,765
Int. Cl. H03k 13/02; G06g 7/16; G01j 1/00
U.S. Cl. 235—150.52 **11 Claims**



A multiplier circuit using analogue and digital techniques in which a multistage register is employed to store one or two quantities to be multiplied. Digital information corresponding to each of the low order numbers is shifted in the register in the high order direction to its corresponding highest order binary related number capable of being stored in the register to allow the processing of both the high and low order numbers in the same linear portion of the operating characteristic of succeeding analogue components provided by the circuit. The multiplication operation is performed with these high order numbers of the particular quantity. At the output, a second shift register stores digital information corresponding to the resultant product of the high order number quantity and the other quantity. If a shift operation was performed in the other register, the digital information stored in the second register is shifted therein in the downward direction an equal number of times. As an alternative embodiment a third register is also provided for storing digital information corresponding to the other quantity. This last-mentioned digital information is shifted in the third register in an upward direction for the low order numbers of the particular quantity in a manner similar to the shifting operation provided for the first register. The multiplication operation in the alternate embodiment is performed with the high order numbers of both quantities, and the resultant digital information stored in the second shift register is shifted in the downward direction a number of times equal to the shifts, if any, provided in the first and third registers.

3,573,449
OPTICAL PULSE EXPANSION SYSTEM
William T. Maloney, Sudbury, Mass., assignor to Sperry Rand Corporation
Filed Oct. 21, 1968, Ser. No. 769,280
Int. Cl. G06g 7/19; H03k 3/42
U.S. Cl. 235—181 **3 Claims**

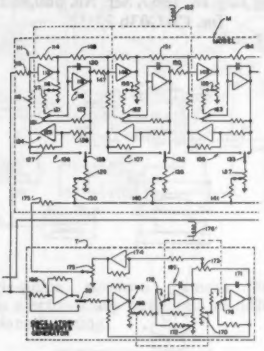


An optical pulse expansion device includes first and second ultrasonic light modulators and a coded mask positioned so that a collimated light beam can be passed serially through these elements and focused on a photodetector. The first ultrasonic light modulator is sandwiched between crossed polarizers that block the passage of light under quiescent conditions. First acoustic pulses are propagated through the first ultrasonic light modulator in synchronism with second acoustical pulses that are propagated through the second ultrasonic light modulator. These pulses limit the light to the acoustically stressed regions of the second ultrasonic light modulator when scanning the coded mask.

3,573,450
MODEL FUNCTION GENERATOR
Louis H. Fricke, Jr., St. Louis, and Robert A. Walsh, Richmond Heights, Mo., assignors to Monsanto Company, St. Louis, Mo.
Original application Oct. 13, 1965, Ser. No. 495,565, now Patent No. 3,505,512. Divided and this application Mar. 25, 1969, Ser. No. 830,558
Int. Cl. G06g 7/19
U.S. Cl. 235—185 **9 Claims**

A model function generator for use with rapid process simulators to determine static and dynamic characteristics in

a process. The model function generator produces an output transfer function in response to an input function and which output transfer function is adjusted to match the output signal from the process. The model function generator includes a plurality of individual modules having transfer functions which are generally orthonormal and each of the modules includes a summer, an integrator, an inverter, a first potentiometer for adjusting the time constant represented by the module and a second potentiometer for adjusting the amplitude coefficient represented by the module.

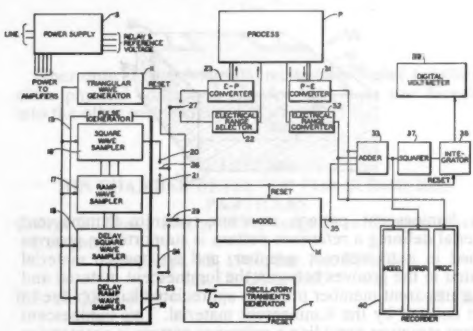


3,573,451

FUNCTION GENERATOR FOR PRODUCING SQUARE AND RAMP WAVE PULSES

Louis H. Fricke, Jr., St. Louis, and Robert A. Walsh, Richmond Heights, Mo., assignors to Monsanto Company, St. Louis, Mo.

Original application Oct. 13, 1965, Ser. No. 495,565, now Patent No. 3,505,512. Divided and this application Aug. 25, 1969, Ser. No. 870,812
Int. Cl. G06g 7/26
U.S. Cl. 235—197 **4 Claims**



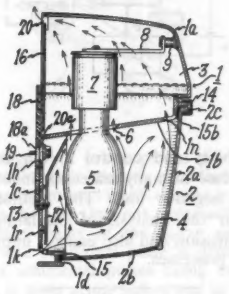
A rapid process simulator for determining both static and the dynamic characteristics which are unknown in a relatively stable process. The simulator includes a pulse generator for producing a perturbating pulse which is applied to the process. The perturbating pulse produces an output signal which can be expressed in the form of a polynomial. The process is compared in the simulator with a model of orthogonal functions which are capable of being normalized to an orthonormal condition. The model is formulated with the idea of choosing a pulse input in such a way as to facilitate the construction of the system. An output signal is also produced in the model which is in turn compared with the output signal from the process in order to achieve an error signal. This signal is squared in the simulator and integrated to determine the characteristics of the system. The simulator includes a transport delay device for delaying the perturbating pulse to the model with respect to the process, so that the output of the process and the model will begin in coincident times. In addition, the simulator is provided with a generator to produce oscillatory transients on a model of the signal to match transient on the process signal.

3,573,452

LUMINAIRE

Lewis W. Kenyon, Flat Rock, and Robert G. Kilpatrick, Hendersonville, N.C., assignors to General Electric Company

Filed Apr. 14, 1969, Ser. No. 815,869
Int. Cl. F21s 1/02
U.S. Cl. 240—73 **15 Claims**



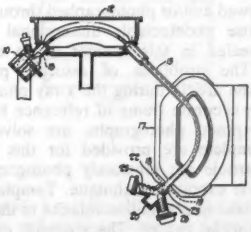
A wall mounted luminaire comprising a one-piece housing having a transverse wall sloping downwardly toward the rear forming an upper ballast compartment and a lower lamp compartment. The housing has rear vent openings at the top and bottom to permit convection flow of heated air through the housing while providing for drainage of rainwater which may enter the unit.

3,573,453

PLURAL BEAM MASS SPECTROMETER FOR CONDUCTING HIGH AND LOW RESOLUTION STUDIES

Patrick Powers, Binstead, England, assignor to Associated Electrical Industries Limited, London, England

Filed May 12, 1967, Ser. No. 638,133
Int. Cl. H01j 39/34
U.S. Cl. 250—41.9 **25 Claims**

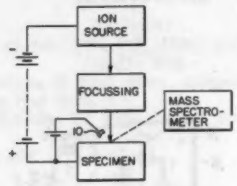


A mass spectrometer is provided with one or two ion sources and two collectors. Slit structure is associated with each ion beam and the mass spectral range of one beam can be compared with the other beam.

3,573,454
METHOD AND APPARATUS FOR ION BOMBARDMENT USING NEGATIVE IONS

Cristian A. Andersen, Solvang, and Henry J. Roden, Santa Barbara, Calif., assignors to Applied Research Laboratories, Inc., Sunland, Calif.

Filed Apr. 22, 1968, Ser. No. 723,026
Int. Cl. H01j *39/34;* H01l *7/00*
U.S. Cl. 250—41.9 3 Claims

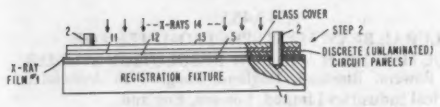


Improved stability and control in ion bombardment is achieved in the case of many materials under bombardment by the use of negative ions. The method is especially advantageous for the analysis of insulating materials by secondary ion emission and also enables improved results in ion implantation processes.

3,573,455
EXAMINATION OF ARTICLES BY X-RAYS

John Suierveld, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 13, 1968, Ser. No. 759,575
Int. Cl. G01n *23/04*
U.S. Cl. 250—65 13 Claims

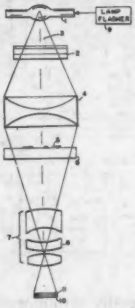


Superimposed X-ray photographs of a partly and/or completely formed laminar printed circuit article, taken before and after a given stage of an article lamination process, are viewed and/or photographed through magnifying optics. Otherwise undetectable dimensional shifts in the article are revealed in this manner at an early stage of manufacture. The problems of assuring precise spatial orientation of the article during the x-ray photography, and of providing an accurate frame of reference for registration of the superimposed photographs, are solved. A special fixture and template are provided for this purpose. The template and article are separately photographed on each film by a double exposure technique. Template and article are separately fixed in orientation relative to the x-ray film by means of the special fixture. The template exposure image constitutes the desired frame of reference for registration of superimposed photograph transparencies. Locating pins on the fixture mate with holes on the template for one x-ray exposure and holes on the article for a second x-ray exposure. The locating pins and the precisely tooled flat surface of the fixture against which the film is held form an absolute frame of reference in three dimensional space.

3,573,456
HIGH RESOLUTION PROJECTION MEANS FOR PRINTING MICRO CIRCUITS ON PHOTORESIST MATERIAL

Roland C. M. Beeh, Brentwood, L. I., N.Y., assignor to OPTOmechanisms, Inc., Plainview, N.Y.

Filed July 26, 1967, Ser. No. 660,862
Int. Cl. G03b *27/32*
U.S. Cl. 250—65 1 Claim

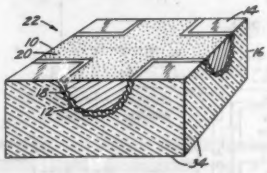


A high resolution projection means for printing demagnified micro circuits or images on photoresist material comprising a monochromatic ultra violet light, a band-pass filter, a quartz condenser lens system, and uncorrected quartz objective lens system and a fluorite aspheric correction plate for the uncorrected lens system.

3,573,457
LUMINESCENT PATTERN STRUCTURE

Gary B. Grant, St. Paul, Minn., and Marvin J. Schmitz, North Hudson, Wis., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 26, 1969, Ser. No. 810,491
Int. Cl. H01j *1/72*
U.S. Cl. 250—71 8 Claims



A luminescent pattern structure wherein luminescent material defining a reference pattern is supported in grooves etched in a transparent member, and an opaque material located in the grooves between the luminescent material and the transparent member prevents appreciable halation due to light emitted by the luminescent material. This luminescent pattern structure providing a reference pattern is coextensive with a target surface capable of displaying an image to enable viewing of the reference pattern superimposed on the image.

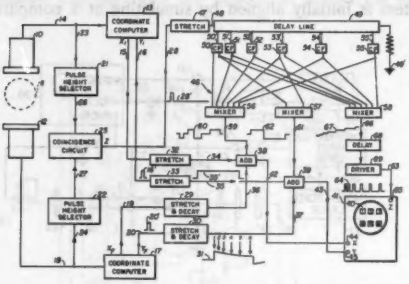
3,573,458
POSITRON CAMERA WITH MULTIPLANE FOCUSING

Hal O. Anger, Berkeley, Calif.

Filed Mar. 27, 1969, Ser. No. 811,027
Int. Cl. G01t *1/20*
U.S. Cl. 250—71.5 14 Claims

A positron radiation detecting camera for obtaining, in one step, an image of the distribution of radioactivity at several different depths in a living subject. Several views are simultaneously presented, each view being focused at a differing plane in the subject between the image detector and focal detectors of the camera. Thus, it is not necessary to know in advance from which plane the radioactivity will

emanate, since at least one image will be in focus. Also, radioactivity may emanate from several planes simultaneously. The radiation is detected as in the prior



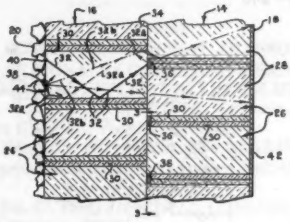
known single-plane positron camera but positional information is electronically combined in differing ratios to obtain multiplane focusing.

3,573,459

COUPLED FIBER OPTIC FACEPLATES

Walter P. Siegmund, Woodstock, Conn., assignor to American Optical Corporation, Southbridge, Mass.

Filed Mar. 28, 1969, Ser. No. 811,397
Int. Cl. G02b *5/16*
U.S. Cl. 250—80 **4 Claims**



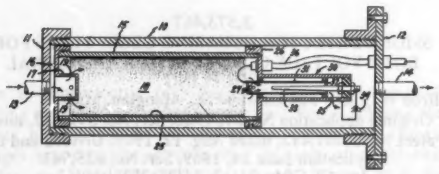
Fiber optical faceplates adapted to be coupled together in close physical contact to transfer light from one faceplate into the other with increased efficiency.

3,573,460

ION CHAMBER DETECTOR FOR SUBMICRON PARTICLES

George F. Skala, Scotia, N.Y., assignor to General Electric Company

Filed Sept. 12, 1966, Ser. No. 578,884
Int. Cl. G01n *5/00*
U.S. Cl. 250—83.6 **1 Claim**



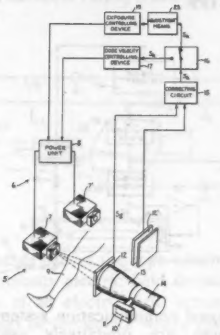
This invention relates to gas analyzing apparatus and more particularly to an improved ion chamber apparatus for detecting the presence of submicron size particles entrained in a gaseous carrier.

3,573,461

METHOD AND APPARATUS FOR TIMING EXPOSURES IN X-RAY PHOTOGRAPHY

Stig Arne Ohlsson, Saab Aktiebolag, Linkoping, Sweden

Filed Apr. 1, 1969, Ser. No. 812,101
Int. Cl. G03b *41/16;* **H05g** *1/28, 1/38*
U.S. Cl. 250—95 **3 Claims**



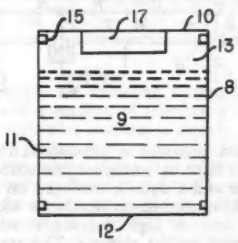
In X-ray photography, prime pulses are produced at a frequency dependent upon intensity of radiation affecting the film. During a predetermined interval early in each exposure, for a time determined by (but not necessarily equal to) the interval of opening delay of the X-ray generator switch means, at least one additional pulse is generated for each prime pulse, the additional pulses being emitted in time-delayed relation to their prime pulses and to one another. A counter receives all pulses and issues a switch-off signal upon receiving the last of a predetermined total number of pulses. Thus, film is subjected to equal quanta of radiation at every exposure even though radiation intensity varies.

3,573,462

SEALED CONTAINER WITH PRESSURE RELIEF FOR HAZARDOUS MATERIAL

Charles A. Wilkins, Augusta, Ga., and Franklin D. R. King, Aiken, S.C., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed Feb. 4, 1969, Ser. No. 796,352
Int. Cl. G21f *3/00, 5/00*
U.S. Cl. 250—108 **7 Claims**

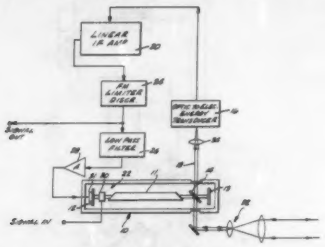


A sealed vessel for containing a hazardous liquid or a liquid shield for radioactive material is provided with fusible plug assemblies within the vessel walls for melting and relieving internal pressure on high temperature exposure without loss of unvaporized liquid. The fusible plug assemblies are designed such that only those fusible plugs contacting the vapor space above the liquid will melt and are arranged such that at least one fusible plug will contact the vapor space regardless of container orientation.

3,573,463
LASER HETERODYNE TRANSCEIVER COMMUNICATION SYSTEM WITH AFC

Frank E. Goodwin, Malibu, and Floyd C. Trimble, Newberry Park, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 1, 1967, Ser. No. 679,739
Int. Cl. H04b *9/00*; **H01s** *3/10*
U.S. Cl. 250—199 **13 Claims**

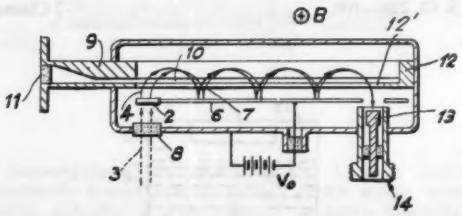


In the disclosed communication system, two transmitter-receiver devices are operatively associated. In each transmitter-receiver two laser beams of different frequencies, one of which laser beams is modulated according to an informational signal, are mixed by means of a beam splitter disposed either inside or outside of the laser oscillator cavity. One of the laser beams is generated by a laser oscillator included in one of the transmitter-receivers, the other laser beam being received from the other distant transmitter-receiver device. The mixed laser beam is translated by a semiconductor photodiode detector into an electrical signal which is then demodulated, the demodulated signal also being used to generate an AFC feedback signal for the laser oscillator.

3,573,464
PHOTOELECTRON MULTIPLIER

Masao Miya, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo-to, Japan

Filed Mar. 6, 1968, Ser. No. 710,860
Claims priority, application Japan, Oct. 13, 1967, 42/65820
Int. Cl. Ho4b *9/00*
U.S. Cl. 250—199 **5 Claims**



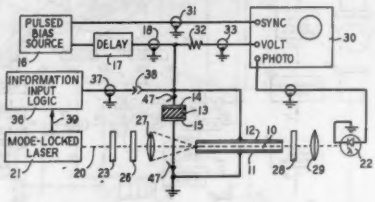
The invention provides a photodetector responsive to modulated laser light. A multiplier phototube is used having a photocathode and a dynode arranged on the same plane. An electric field is used to accelerate the electrons from the photocathode and a high frequency standing wave is provided adjacent to the dynode. The trajectories of the electrons are phase compressed and the electron stream is highly localized.

3,573,465
GUNN EFFECT DRIVER FOR OPTICAL MODULATORS

Bernard G. King, Rumson, and Richard P. Riesz, Chatham, N.J., assignors to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Dec. 2, 1968, Ser. No. 780,346
Int. Cl. H04b *9/00*
U.S. Cl. 250—199 **8 Claims**

A Gunn effect device is utilized to provide pulses of the high amplitude and frequency needed to drive an optical modulator, such as a lithium tantalate crystal for efficiently utilizing the bandwidth of light transmitted through the modulator. An acoustically absorbent mounting is provided for the modulator to suppress acoustical ringing resulting from piezoelectric effects in the modulator. The modulation system is initially aligned by simulating at a comparatively

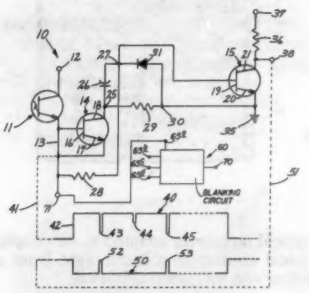


low frequency the drive amplitudes in order to establish a maximum condition of modulation in the optical part of the system. Thereafter, signals at the Gunn effect device output rate are supplied for controlling the modulator. Information-representative signals coupled to the modulator through the Gunn effect device are synchronized with the optical system utilizing the modulator.

3,573,466
LIGHT DETECTOR DISCRIMINATOR

John L. Von Feldt, Rochester, Minn., assignor to Rochester Datronics, Inc., Rochester, Minn.

Filed July 22, 1968, Ser. No. 746,544
Int. Cl. G01j *1/16*; **H03k** *19/14*
U.S. Cl. 250—206 **3 Claims**



Two matched semiconductor junctions at least one of which is included in a transistor, connected in circuit with a pair of resistors and a capacitor so that each of the junctions receives a portion of an input current supplied by a light sensitive device, the portion received being dependent upon the ratio of the resistances, said capacitor acting to cause the transistor to switch from a normally saturated condition to a nonconducting condition when the current supplied by the light sensitive means drops below a predetermined level.

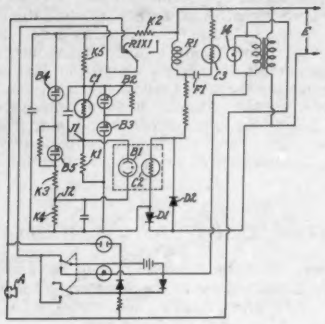
3,573,467
SMOKE DETECTOR UTILIZING GLOW TUBES FOR BOTH VOLTAGE COMPENSATION AND SIGNAL COUPLING

Alfred W. Vasel, 222 Linwood St., Abington, Mass.

Original application Nov. 7, 1966, Ser. No. 592,617, now Patent No. 3,461,443, dated Aug. 12, 1969. Divided and this application June 24, 1969, Ser. No. 835,961
Int. Cl. G01n *21/12*, *21/26*; **H01j** *39/12*
U.S. Cl. 250—206 **1 Claim**

A circuit for the photoelectric detection of smoke is provided with means for compensating for fluctuations in the output voltage due to variations in the main supply voltage which energizes both the light source and the photocell. This compensating means utilizes a voltage compensating circuit

which comprises glow tubes and which is coupled to the photocell via another glow tube. The photocell itself is connected in series with a resistor, the series combination of the resistor and photocell are connected across the main



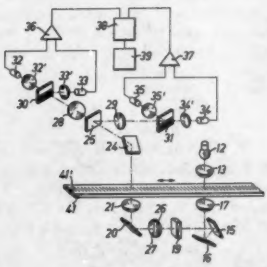
supply voltage. The junction between the photocell and resistor is connected to the coupling glow tube which in turn is photon coupled to a photosensitive resistor which, when activated, inhibits rectification in a DC relay holding circuit causing the relay to release thereby activating an alarm.

3,573,468

PHOTOELECTRIC INCREMENTAL TRANSDUCER FOR 4-PHASE SIGNALS COMPRISING MEANS FOR GEOMETRICALLY SPLITTING THE LIGHT BEAMS

Karl Lang, Atzbach, Kreis Wetzlar, Germany, assignor to Ernst Leitz G.m.b.H., Wetzlar, Germany

Filed Oct. 16, 1969, Ser. No. 866,845
Claims priority, application Germany, Oct. 19, 1968, P 18 04 028.3
Int. Cl. H01j *3/14, 39/12;* **G01d** *5/34*
U.S. Cl. 250—209 **5 Claims**



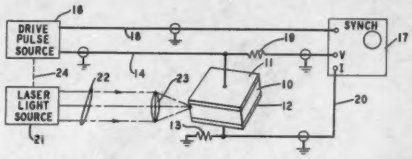
In a photoelectric incremental transducer wherein the grating is reproduced after a polarizing image splitting step, either onto a second grating or onto itself and indexing images are reproduced thereafter by way of a polarizing splitter and position-defining signals are obtained at at least two photoelectric receivers, the improvement comprising the insertion of a geometric splitter which produces an image shift of one-half a graduation interval in the image beam path behind the place of reproduction in the plane conjugate with respect to the geometric splitter, and means are provided for the separate reception of the different beams.

3,573,469

OPTICALLY CONTROLLED PHASE ADJUSTMENT FOR ELECTRICAL SIGNALS

Richard P. Riesz, Chathan, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Nov. 15, 1968, Ser. No. 776,220
Int. Cl. H01l *15/00;* **H03k** *3/26*
U.S. Cl. 250—211 **12 Claims**



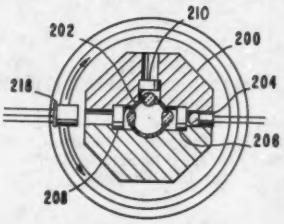
A semiconductor device of the type which nucleates and propagates high intensity electric field domains in response to the application of an electric field across the device is illuminated at a part of the device where such domains are nucleated and with sufficient energy density to alter the phase relationship of the propagated domains with respect to the applied electric field. Such a device is employed for gating pulses of electromagnetic energy through an electro-optical modulator to an optical delay line for reentering digital information in the delay line as it is coupled from the output of such line.

3,573,470

PLURAL OUTPUT OPTIMETRIC SAMPLE CELL AND ANALYSIS SYSTEM

Floyd C. Haley, La Canada, Calif., assignor to California Institute of Technology, Pasadena, Calif.

Filed Mar. 28, 1968, Ser. No. 716,885
Int. Cl. G01n *21/26;* **G02b** *5/14;* **H01j** *5/02*
U.S. Cl. 250—218 **15 Claims**

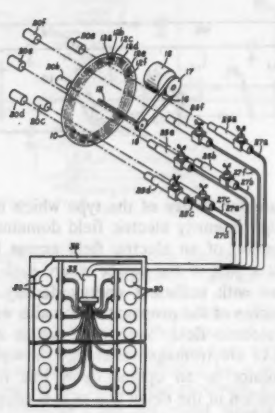


Apparatus suitable for receiving a sample for optimetric analysis along with a method of fabricating the apparatus is disclosed. The apparatus includes a sample cell comprising an opaque hollow tubing. A plurality of apertures are defined in the wall of the tubing and a lens barrel which extends beyond the opposite surfaces of the wall is supported within at least one of the apertures. A glass lens is mounted in the lens barrel. A housing is provided with a first channel for receiving the sample cell and a further series of channels extending from the exterior of the housing to the sample cell apertures. A filter element is housed in each of these latter channels. These channels also slidingly receive an excitation light source or a photodetector cell to permit selective focusing thereof. A sample cell containing at least three apertures in the walls thereof can be mounted for rotation relative to a light source or photodetection means for simultaneous or alternate optimetric determination of the components of a single sample. The sample cell is fabricated by supporting a lens barrel within the aperture. A molten portion of glass is deposited in the lens barrel and cooled while in a horizontal position to form a lens having an acceptable angle of 130° to 170° at an aperture of *f7* or below.

3,573,471
OPTICALLY ENCODED DISK READ OUT SYSTEM EMPLOYING OPTICAL FIBERS

Edwin R. Kolb, Cleveland, Ohio, assignor to Harris-Intertype Corporation, Cleveland, Ohio

Continuation-in-part of application Ser. No. 287,047, June 11, 1963, now Patent No. 3,307,172. This application Jan. 9, 1967, Ser. No. 608,161
Int. Cl. G01n *21/30*
U.S. Cl. 250—219 1 Claim

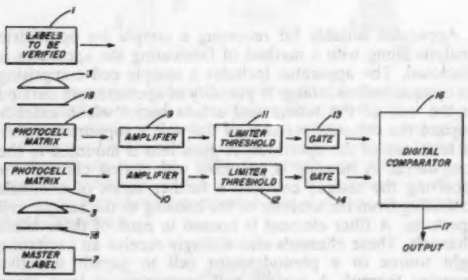


Binary data optically recorded in circular tracks on a rotating member is converted into electrical signals by illuminating a limited area on the member, magnifying the image of the illuminated area and projecting that image onto a fiber optic assembly having optical fibers for each track on the member which route the light information to photoelectric transducers and convert the light information into electrical signals. Both optical and mechanical magnifying means are used to permit high density radial and circumferential packing of the binary data while permitting the use of relatively large but highly sensitive photoelectric transducers.

3,573,472
LABEL VERIFICATION SYSTEM USING PHOTOCELL MATRICES

Michael Madalo, Whitehouse Station, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Apr. 13, 1970, Ser. No. 27,899
Int. Cl. G08c *9/06*
U.S. Cl. 250—219 6 Claims

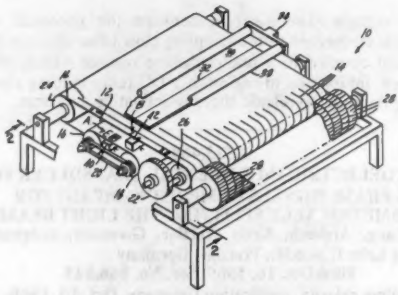


Verification of symbols such as on labels is effected by imaging each label to be verified onto a matrix of photocells and imaging an authentic label onto another matrix of photocells. The outlines of the symbols strike different photocells in the matrices causing a response from each photocell depending on the amount of energy it receives. The output from each photocell is separately amplified, either by individual separate amplifiers or by a single amplifier for each matrix which is electronically scanned across photocell outputs in conventional manner. The outputs from each photocell are limited or otherwise electronically processed so that responses are produced above or below a threshold, depending on whether the photocells encountering the image of the symbols give out more or less energy and these pulses or outputs, which are in digital form, are then compared in a conventional digital comparator. If the label to be verified gives the same signal as an authentic label, the comparator does not have any output and another label can then be verified. If the label is not authentic, an output from the digital comparator sounds an alarm and can remove the container bearing the label from a moving stream. Preferably the symbols contain photoluminescent substances and the matrix of photocells is provided with suitable filters, so that when the labels are illuminated with ultraviolet light photocell responses are at a much higher degree of contrast.

3,573,473
RADIATION SENSITIVE DIGITAL MESSAGE ENTRY DEVICE

Zeev Lieser, Elizabeth, N.J., assignor to The United States of America as represented by the Secretary of the Navy

Filed Oct. 6, 1969, Ser. No. 863,778
Int. Cl. G08c *9/06*
U.S. Cl. 250—219 10 Claims



A digital message entry device wherein a wide format scroll displaying instructions for message composition is placed in cooperative encompassing relation to a plurality of message scrolls with means for selectively moving each scroll to provide message storage and display and in which a self-energizing light source and associated photodiode means are provided to provide readout means for bulk transmission to a central location to be decoded, displayed, switched or acted upon.

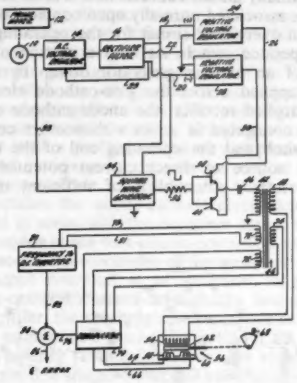
3,573,474
ERROR SIGNAL GENERATING SYSTEM

Floyd Grossoehme, Cincinnati, Ohio, assignor to General Electric Company

Filed May 9, 1969, Ser. No. 870,831
Division of Ser. No. 506,993, Nov. 9, 1965, Pat. No. 3,501,687.
Int. Cl. H02p *9/04*
U.S. Cl. 290—40 1 Claim

A system for producing an error signal which represents the difference between actual and desired prime mover speed. The output of a prime mover driven generator is rectified to provide positive and negative signals which are alternately impressed on a transformer primary winding via a switching circuit controlled by a square wave generator, the frequency of which is proportional to engine speed. A first secondary winding of said transformer feeds a variable coupling transducer, the output of which feeds one input of a phase responsive demodulator. The coupling of said transducer being determined by a prime mover controller setting. A second transformer secondary winding feeds a frequency to DC converter to provide a DC signal, the magnitude of which thus represents the actual prime mover speed. Third and fourth transformer secondary windings feed

inputs of said phase responsive demodulator, the output of which thus provides a desired prime mover speed signal.

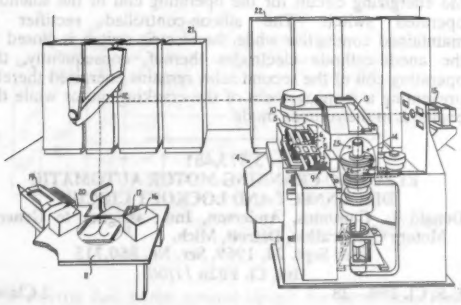


Finally, a summing network combines the actual and desired speed signals to produce an error signal which may be employed to control the rate of the prime mover.

3,573,475
MEANS FOR ADJUSTING SENSITIVITY OF SPIRAL PATH SCANNING MECHANISM

Sten Nordlund, and Bengt Wetterbrandt, Jonkoping, Sweden, assignors to Saab Aktiebolag, Linkoping, Sweden

Filed Aug. 28, 1969, Ser. No. 853,830
Claims priority, application Sweden, Aug. 28, 1968, 11533/68
Int. Cl. G01n *31/30;* G02b *17/00;* H01j *3/14*
U.S. Cl. 250—219 **5 Claims**



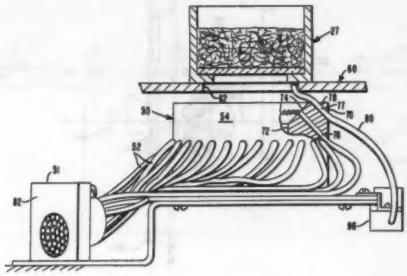
In spiral scanning apparatus for bubble chamber photographs, comprising an elongated plane mirror which is lengthwise inclined upwardly and outwardly to an axis about which it rotates, to reflect toward the axis light shone downwardly onto it, and a periscope which rotates to have its eye face the mirror and simultaneously moves axially to scan along it, superimposed slotted fixed and movable mask means in front of the periscope eye enable sensitivity and selectivity to be adjusted for different photographs.

3,573,476
APPARATUS FOR DETERMINING REFLECTIVE COLOR INDEX OF FIBROUS SAMPLES

Allan F. Falcoff, and James N. Guthrie, Seaford, Del., assignors to E. I. duPont de Nemours and Company, Wilmington, Del.

Filed Nov. 20, 1968, Ser. No. 777,310
Int. Cl. G02b *5/16;* G01j *3/50*
U.S. Cl. 250—227 **7 Claims**

An apparatus for uniformly illuminating a fiber sample in a colorimeter wherein a plurality of fiber optic light guides are arranged circumferentially around the sample. One end of each light guide is directed upwardly toward the sample and the other end of each light guide is positioned in the directed path of an illumination source to receive light therefrom. An

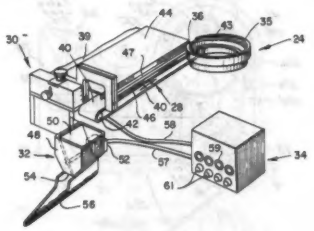


auxiliary light guide directed toward the sample holder and coupled to the electrical measuring circuitry of the colorimeter senses the absence of a sample holder and deactivates the electrical components of the colorimeter.

3,573,477
RADIATION SENSITIVE APPARATUS FOR DETECTING CONVEYED ARTICLES

Michael C. Klapes, Lynnfield, Mass., assignor to Delta Engineering Corporation, Winchester, Mass.

Filed Sept. 17, 1968, Ser. No. 760,340
Int. Cl. G06m *7/00*
U.S. Cl. 250—223 **7 Claims**



An improved article-detecting apparatus for use with a counting machine of the type having a conveyor for carrying articles to be counted from a supply hopper to a batching station, the detecting apparatus is adapted to sense each article on said conveyor and to provide a signal output for a counter in response to each article that is sensed, the detecting apparatus comprises a light source for directing a substantially horizontal beam of light laterally across the conveyor to a photocell, and means for vertically adjusting the light beam and photocell relative to the conveyor.

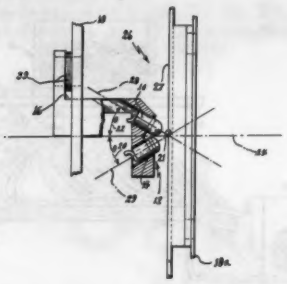
3,573,478
OPTICAL SECTOR SWITCH APPARATUS FOR INDICATING DEGREE OF ANGULAR MOVEMENT BETWEEN TWO MOVABLE SURFACES

Kenneth J. Stempler, Bronxville, N.Y., assignor to the United States of America, as represented by the Secretary of the Air Force.

Filed Feb. 24, 1969, Ser. No. 801,628
Int. Cl. H01j *39/12*
U.S. Cl. 250—239 **9 Claims**

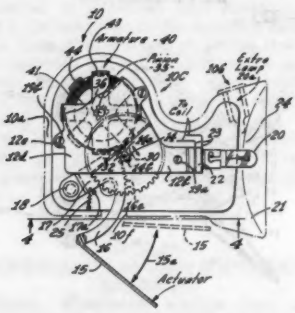
An apparatus for indicating the degree of angular movement between two relatively moveable surfaces is provided and is comprised of an infrared radiation emitter and an infrared radiation sensor, both mounted to one of the moveable surfaces, and a reflective surface of predetermined extent mounted to the other moveable surface. Both emitter

and sensor are solid state devices. The emitter and sensor are placed such that their geometrical axes approximately coincide at the reflector surface to reflect the emitted radiation back toward the sensor to activate indicating



circuitry associated with the sensor to indicate the position of the moveable surfaces with respect to each other. When the reflector is not positioned such that it receives radiation from the emitter, the indicating circuitry will not be activated.

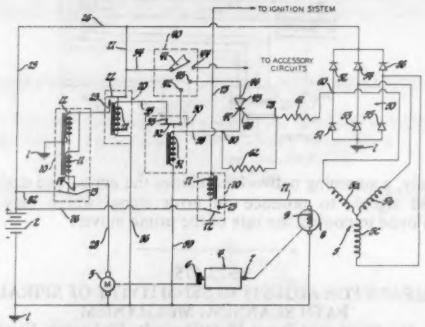
3,573,479
GENERATOR FLASHLIGHT
Harold F. Rieth, 911 22nd St., Santa Monica, Calif.
Filed Nov. 17, 1967, Ser. No. 683,866
Int. Cl. H02p *9/04*
U.S. Cl. 290—1 **13 Claims**



A reciprocating actuator meshes with a pinion and during an actuating stroke in one direction the pinion is placed first in a first position and rotates. A gearwheel rotates with the pinion and meshes with a second pinion on the shaft of a rotor when the first pinion rotates in the first position. At the end of the stroke the pinion meshing with the actuator rolls into a second position in which the gearwheel is disengaged from the pinion on the rotor. During the return stroke of the actuator, pinion and gearwheel rotate in the opposite direction and disengage from the pinion on the rotor. The disclosure shows a generator powering the lamp in the flashlight.

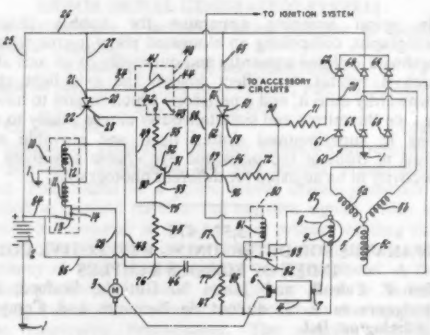
3,573,480
ELECTRIC CRANKING MOTOR AUTOMATIC DISCONNECT AND LOCKOUT CIRCUIT
Donald L. Cummins, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed Sept. 17, 1969, Ser. No. 858,724
Int. Cl. F02n *11/08*
U.S. Cl. 290—38 **2 Claims**

An electric-cranking motor automatic disconnect and lockout circuit. The normally open contacts of a cranking motor solenoid-operated switch, having the operating coil thereof connected across a source of direct current potential through the normally open contacts of a first relay, are connected in series with the cranking motor across a source of direct current potential. Upon the closure of an electric switch, the source of direct current potential energizes the operating coil of the first relay, through the electric switch and the normally closed contacts of a second relay in series, to close the associated normally open contacts thereof which establish an energizing circuit for the operating coil of the solenoid-operated switch. At least a portion of the output potential of an electric generator driven by the cranked engine is applied across the gate-cathode electrodes of a silicon-controlled rectifier, the anode-cathode electrodes of which are connected in series with another contact of the electric switch and the operating coil of the second relay across the source of direct current potential. When the generator output potential is of sufficient magnitude to



produce gate-cathode current through the silicon-controlled rectifier, the resulting anode-cathode current flow therethrough establishes an energizing circuit for the operating coil of the second relay to open the associated normally closed contacts, thereby interrupting the energizing circuit for the operating coil of the first relay to permit the associated normally open contacts to open which interrupt the energizing circuit for the operating coil of the solenoid operated switch. The silicon-controlled rectifier is maintained conductive while the electric switch is closed to the anode-cathode electrodes thereof, consequently, the operating coil of the second relay remains energized thereby preventing a reengagement of the cranking motor while the engine is in the running mode.

3,573,481
ELECTRIC CRANKING MOTOR AUTOMATIC DISCONNECT AND LOCKOUT CIRCUIT
Donald L. Cummins, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.
Filed Sept. 24, 1969, Ser. No. 860,715
Int. Cl. F02n *11/00*
U.S. Cl. 290—28 **2 Claims**



An electric cranking motor automatic disconnect and lockout circuit. The normally open contacts of a cranking motor solenoid-operated switch, having the operating coil thereof connected across a source of direct current potential

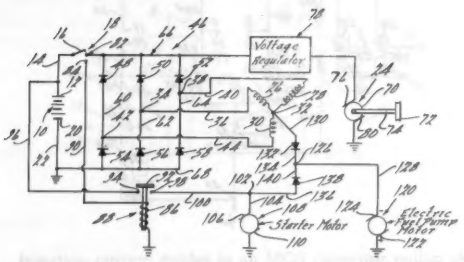
through the anode-cathode electrodes of a first silicon-controlled rectifier, are connected in series with the electric cranking motor across a source of direct current potential. Upon the closure of an electric switch, the source of direct current potential is applied across the emitter-base electrodes and the emitter-collector electrodes of a type PNP transistor. The conducting transistor produces a trigger signal which is applied across the gate-cathode electrodes of the first silicon-controlled rectifier to render this device conductive to establish an energizing circuit for the operating coil of the solenoid operated switch and a charging circuit for a capacitor. At least a portion of the output potential of an electric generator driven by the cranked engine is applied across the gate-cathode electrodes of a second silicon-controlled rectifier, the anode-cathode electrodes of which are connected in series with the capacitor across the anode-cathode electrodes of the first silicon-controlled rectifier and across the base-emitter electrodes of the transistor. When the generator output potential is of sufficient magnitude to produce gate-cathode current through the second silicon-controlled rectifier, the resulting anode-cathode current flow therethrough establishes a discharge circuit for the capacitor in an inverse polarity relationship across the anode-cathode electrodes of the first silicon-controlled rectifier to extinguish this device, thereby interrupting the energizing circuit for the operating coil of the solenoid-operated switch, and effectively connects the emitter-base electrodes of the transistor together to extinguish this device to remove the trigger signals from the first silicon-controlled rectifier thereby preventing the retriggering of the first silicon-controlled rectifier after the capacitor has discharged.

3,573,482

ELECTRIC FUEL PUMP CONTROL CIRCUIT

Kenneth R. Brooks, Dexter, and Jacques Mosier, Ypsilanti, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed July 10, 1969, Ser. No. 840,650
Int. Cl. F02n *11/00*
U.S. Cl. 290—38 **7 Claims**



An electric fuel pump control circuit for an electric fuel pump that furnishes fuel for an internal combustion engine in which electrical energy is supplied to the fuel pump during starting operations from the electrical storage battery of the internal combustion engine and during normal running operations, after starting operations have been terminated, is supplied from one of the output windings of an alternator which is operated by the internal combustion engine. The electric fuel pump is energized, during starting operations, by battery and system voltage and subsequent to starting operations is energized from the alternator output windings at an average voltage of substantially half the battery and system voltage and at a peak voltage which is proportional to engine speed.

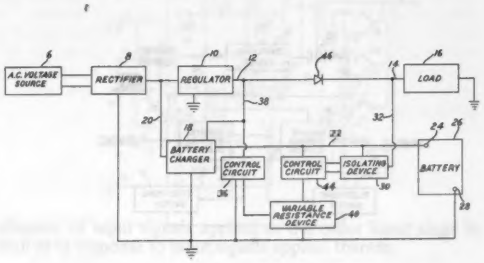
3,573,483

POWER SUPPLY CONTROL APPARATUS

Gregory C. White, Evansville, Ind., assignor to Essex International, Inc.,, Fort Wayne, Ind.

Filed May 2, 1969, Ser. No. 821,241
Int. Cl. H02j *7/00*
U.S. Cl. 307—66 **3 Claims**

In the event a primary voltage source fails, an auxiliary voltage source may be provided to a load by a battery and an isolating transistor that conducts current to the load from the battery. The isolating transistor is controlled by a first control circuit that causes the transistor to conduct if the voltage produced by the primary voltage source decreases below a predetermined value. The isolating transistor is also



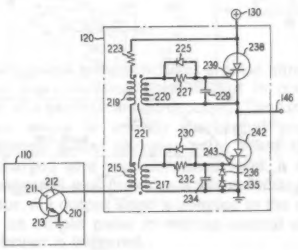
controlled by a second control circuit that returns the isolating transistor to its nonconductive state if the voltage produced by the battery decreases below a predetermined value. Both the first and second control circuits preferably comprise a Zener diode and a resistor.

3,573,484

PULSE CIRCUIT

Robert W. Engroff, St. Charles, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Aug. 6, 1968, Ser. No. 750,506
Int. Cl. H03k *17/00*
U.S. Cl. 307—252 **12 Claims**



A pulse circuit includes a pair of controlled switches connected in series with a voltage source. The gates of the switches are coupled through a network to a pulse source. The network operates to disable one gate while the other gate is enabled by a pulse from the pulse source so that the concurrent closing of both switches is prevented.

3,573,485

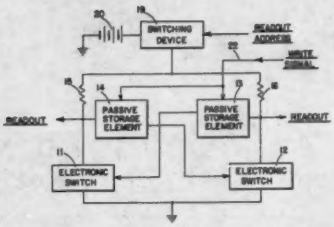
COMPUTER MEMORY STORAGE DEVICE

Delbert L. Ballard, 9352 Van Alden, Northridge, Calif.

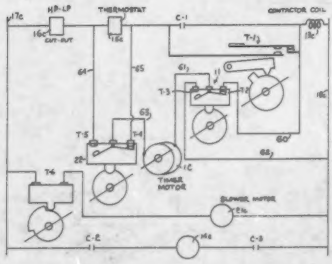
Filed June 24, 1968, Ser. No. 739,436
Int. Cl. G11c *11/02, 11/22;* **H03k** *17/80*
U.S. Cl. 307—88 **12 Claims**

A flip-flop circuit is formed with a pair of active electronic-switching elements. Connected in circuit with at least one of these switching elements as an impedance coupler is a passive storage element. A digital signal to be stored is written into the passive storage element, thereby changing its effective impedance in the circuit. The readout signal is obtained from the electronic-switching elements by providing power to such active switching elements in

response to a readout address, the electronic-switching elements assuming a conductive or nonconductive state in accordance with the effective circuit impedance of the associated passive storage element.



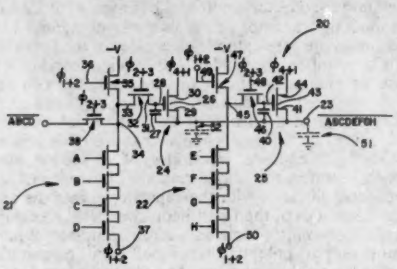
3,573,486
CONDITION CONTROL DEVICE AND SYSTEM
John L. Harris, Delafield, Wis., assignor to Deltrol Corp., Bellwood, Ill.
Filed Aug. 14, 1969, Ser. No. 850,011
Int. Cl. H01h 43/12
U.S. Cl. 307—116 14 Claims



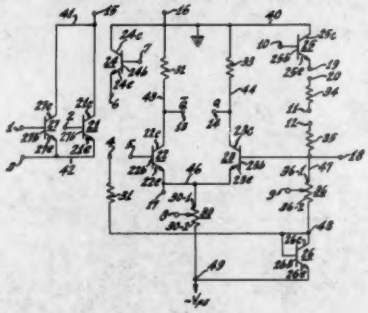
Protection against refrigeration compressor burnout by short cycling is provided by a timer having an electric motor. This motor is initially energized through a circuit in series with a thermostat and the contactor coil. The motor is then transferred to a circuit shunting the thermostat and then the timer load switch closes energizing the contactor. This shunts the timer motor and stops it. When the thermostat is satisfied, it drops out the contactor and breaks the shunt circuit for the timer motor allowing it to run back to the starting point where the motor is again placed in series with the thermostat. A variable delay is provided by a second timer motor switch which first energizes the motor in parallel with the contactor coil.

3,573,487
HIGH SPEED MULTIPHASE GATE
Robert W. Polkinghorn, Huntington Beach, Calif., assignor to North American Rockwell Corporation
Filed Mar. 5, 1969, Ser. No. 804,543
Int. Cl. H03k 19/08
U.S. Cl. 307—205 2 Claims

Buffering devices of a multiphase gate are connected either in series or parallel with individual logic functions implementing a composite multiple phase gate for either ANDing or ORing the functions at the output of the multiphase gate so that the number of gates in each function is relatively small. As a result of reducing the number of gates in each logic function, the multiphase gate can be operated at a higher clock frequency.



3,573,488
ELECTRICAL SYSTEM AND LSI STANDARD CELLS
Howard R. Beelitz, Princeton, N.J., assignor to RCA Corporation
Filed Sept. 5, 1967, Ser. No. 665,344
Int. Cl. H03k 19/08
U.S. Cl. 307—207 11 Claims

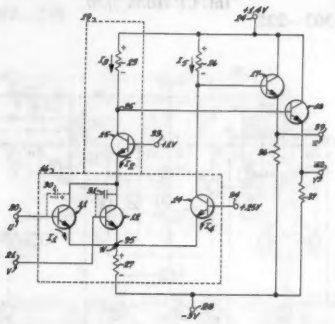


A large scale integrated (LSI) array of standard (i.e. unit) cells and systems implemented thereby is described. The standard cell includes a current mode switching transistor pair, a pair of fan-in expander transistors, a further transistor useful either as an output emitter-follower or as another fan-in transistor and a V_{ref} deriving circuit which includes some resistors and another pair of transistors. Both committed and uncommitted connecting points are provided for the cell whereby the system designer is given the flexibility of specifying the functional identity of a cell, a group of cells, parts of a cell and various combinations thereof by means of a design connection pattern of the various uncommitted connecting points.

3,573,489
HIGH SPEED CURRENT-MODE LOGIC GATE
Bohumir Sramek, Phoenix, Ariz., assignor to General Electric Company
Filed May 29, 1969, Ser. No. 845,924
Int. Cl. H03k 19/34, 19/30
U.S. Cl. 307—215 11 Claims

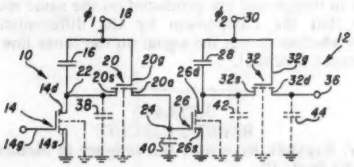
A common-base transistor amplifier in the collector circuit of a current-mode logic gate reduces the Miller effect or

multiplication of capacitance between the base and collector of transistors connected to the signal-input terminals. This



increases the operating speed and increases the fan-out of the logic gate.

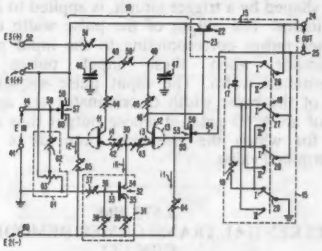
3,573,490
CAPACITOR PULL-UP REIGISTER BIT
Leonce J. Sevin, Jr., and Donald J. Redwine, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 30, 1968, Ser. No. 787,712
Int. Cl. G11c *19/00*; **H03k** *21/00, 23/08*
U.S. Cl. 307—221 **10 Claims**



Injection current modes in an MOS capacitor pullup shift register bit are eliminated or minimized by addition of circuit elements between a driver transistor switch and a coupling transistor switch. In one form, this additional circuitry includes a push-pull stage of two transistor switches interconnected between the driver switch and the coupling switch. In an MOS transistor configuration of a shift register, an alloy diode is connected in parallel to the PN diode of the coupling transistor to minimize the effects of injection currents. Injection currents are also controlled in an MOS transistor configuration of a shift register by a P-type diffusion around each transfer stage of a shift register bit.

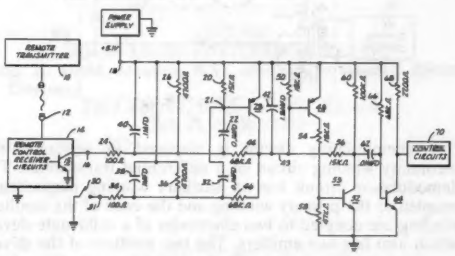
3,573,491
VIDEO LOGARITHMIC AMPLIFIER
Jerry E. Goss, and Roger R. Hansen, Owego, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Aug. 28, 1967, Ser. No. 663,809
Int. Cl. G06g *7/12*
U.S. Cl. 307—229 **11 Claims**

A video (wideband) logarithmic amplifier employs a high gain differential amplifier that has an output stage which includes inter alia an element having a logarithmic transfer characteristic. The output stage generates a feedback signal to one of the input stages of the differential amplifier and maintains the input stages in a balanced condition in the



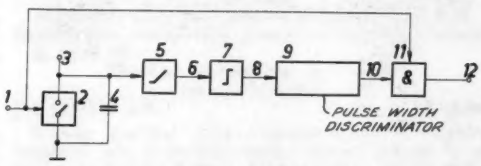
absence of input signals applied to the other input stage as well as in response to input signals applied thereto.

3,573,492
NOISE IMMUNITY CIRCUIT
Thomas Austin Bridgewater, Indianapolis, Ind., assignor to RCA Corporation
Filed June 2, 1969, Ser. No. 829,395
Int. Cl. H03k *5/20*
U.S. Cl. 307—234 **8 Claims**



A remote control system includes a noise immunity circuit providing a short duration pulse output in response to an input signal of a predetermined duration. The circuit includes a capacitor which is initially discharged and thereafter charged through a first charging path. When the capacitor becomes charged to a predetermined level, a multivibrator circuit is triggered and provides a second charging path for the capacitor. An output stage is coupled to the multivibrator to provide an output pulse to remote control circuits when the multivibrator is triggered.

3,573,493
SELECTION CIRCUIT FOR SELECTING PULSES FROM A PULSE SEQUENCE IN DEPENDENCE ON THE INTERPULSE INTERVAL THEREBETWEEN
Gerhard Kamin, Traisa, Germany, assignor to Fernseh GmbH, Darmstadt, Germany
Filed July 2, 1969, Ser. No. 838,424
Claims priority, application Germany, July 4, 1968, P 17 62 541.1
Int. Cl. H03k *5/20*
U.S. Cl. 307—234 **8 Claims**



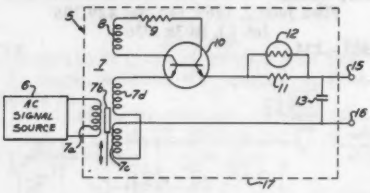
A capacitor as charged linearly with respect to time during the interpulse intervals of a pulse sequence and short

circuited during the occurrence of the pulses. The voltage on the capacitor is supplied to a threshold circuit set to a predetermined threshold value. The output of the threshold circuit, shaped by a trigger circuit, is applied to a pulse width discriminator. The output of the pulse width discriminator comprises pulses corresponding to the input pulses to the discriminator when these input pulses exceed a predetermined width. The input pulse sequence and the output of the pulse width discriminator are applied to the inputs of an AND gate, at whose output thus appear those pulses for which the interpulse interval is less than a predetermined value.

3,573,494
DIFFERENTIAL TRANSFORMER DEMODULATING CIRCUIT

Grover K. Houpt, Wayne; Edward T. Thomson, Phoenixville, and Joseph A. Kihm, King of Prussia, Pa., assignors to Automatic Timing & Controls, Inc., King of Prussia, Pa.

Filed Jan. 12, 1968, Ser. No. 697,470
Int. Cl. H03k *5/20;* **H01r** *5/00*
U.S. Cl. 307—235 **8 Claims**

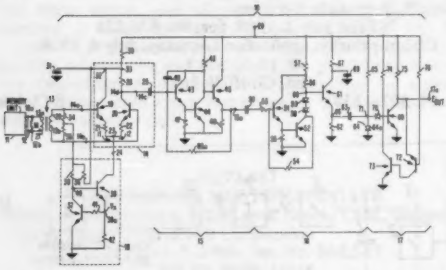


A demodulating circuit is disposed in series in the secondary winding circuit of a differential transformer. The demodulation circuit has an auxiliary winding magnetically coupled to the primary winding and the ends of the auxiliary winding are coupled to two electrodes of a solid-state device which also has two emitters. The two emitters of the device are connected in series with the secondary winding of the transformer and with a smoothing network for the demodulated AC voltage.

3,573,495
THRESHOLD CIRCUIT APPARATUS EMPLOYING INPUT DIFFERENTIAL AMPLIFIER FOR TEMPERATURE STABILIZING THE THRESHOLD LENEL THEREOF

Melvin P. Xylander, Apalachin, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 26, 1968, Ser. No. 755,069
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **6 Claims**

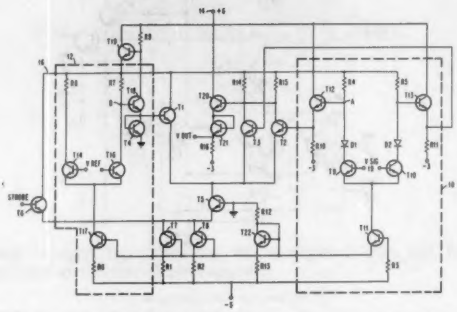


The gain of a difference amplifier is controlled as a function of temperature to offset variations, which are due to temperature changes, in the threshold level of a threshold device.

3,573,496
DC SENSE AMPLIFIER

Joseph A. Lake, Jr., Lincoln Park, N.J., and Hannon S. Yourke, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 19, 1968, Ser. No. 776,947
Int. Cl. H03k *5/20*
U.S. Cl. 307—235 **8 Claims**

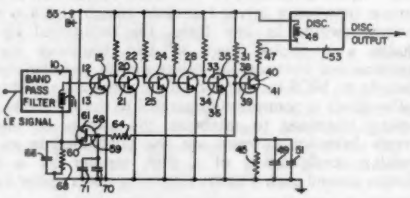


This specification describes a comparator for comparing memory sense signals with a reference potential and for providing an output indicative of whether the sense signals are larger or smaller than the reference potential. The comparator includes a differential circuit that compares the output of a signal amplifier, for the sense signals, to the voltage drop across a forward biased diode. Simultaneously, the output of a model or reference amplifier, which amplifies the reference potential is compared to the diode voltage drop and the output levels of the model amplifier and the signal amplifier are simultaneously adjusted by a feedback network until the output of the model amplifier is equal to the diode voltage drop. The model and sense amplifiers are practically identical in design and are produced on the same monolithic chip so that the comparison by the differential circuit indicates whether or not the signal on the sense line exceeds the reference potential.

3,573,497
BIASING CIRCUIT

Albert V. Kraybill, Riverside, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Oct. 9, 1969, Ser. No. 866,130
Int. Cl. H03k *5/08;* **H04b** *1/16*
U.S. Cl. 307—237 **10 Claims**



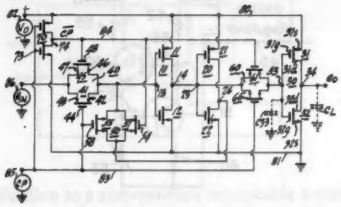
Limiting amplifier adapted to be constructed in integrated circuit form and including plurality of direct current coupled transistor stages with input and output circuits interconnected therewith. The amplifier has sufficient gain to limit on noise so that a rectangular wave output signal is developed at the output circuit. An integrating network responsive to the output signal provides a bias voltage which is coupled to the input circuit to control the bias applied to the semiconductor devices so that the duty cycle of the rectangular wave output signal is regulated to be preferably a 50 percent duty cycle.

3,573,498

COUNTER OR SHIFT REGISTER STAGE HAVING BOTH STATIC AND DYNAMIC STORAGE CIRCUITS

Richard W. Ahrons, Somerville, N.J., assignor to RCA Corporation

Filed Nov. 24, 1967, Ser. No. 685,376
Int. Cl. G11c 11/34
U.S. Cl. 307—238 7 Claims



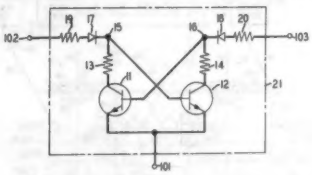
Signal translating stages which are useful in shift register applications are described. The signal translating stage is shown, in one example, to be constructed of complementary IGFET devices and, in another example, of single conductivity type IGFET devices. In either example, the shift register stage includes a flip-flop storage circuit and an inverter input capacitance node storage circuit which are operatively coupled and decoupled under the control of clock signals to translate information from the input to the output of the stage.

3,573,499

BIPOLAR MEMORY USING STORED CHARGE

Dennis J. Lynes, Madison, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed May 2, 1969, Ser. No. 821,408
Int. Cl. G11c 11/40
U.S. Cl. 307—238 7 Claims



A semiconductor memory characterized by simplified memory cells which operate on the charge storage phenomenon. Each cell comprises a pair of cross-coupled transistors, the collector electrodes of which are connected through separate diodes to a pair of information lines. Power is supplied in pulsed fashion via the information lines. No conventional load impedances are used. The coupling diodes prevent discharge of stored information during intervals in which no power is being supplied. The memory advantageously is embodied as a semiconductor integrated circuit.

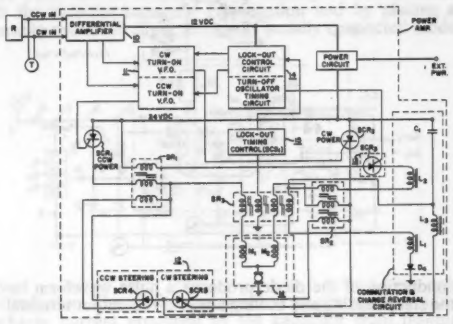
3,573,500

POWER AMPLIFIER CONTROL SYSTEM

Charles E. Leonard, South Burlington, Vt., assignor to General Electric Company

Original application Apr. 26, 1967, Ser. No. 633,872. Divided and this application Jan. 24, 1969, Ser. No. 807,155
Int. Cl. H03k 17/00
U.S. Cl. 307—252 3 Claims

A bidirectional motor control system and apparatus comprising a power amplifier utilizing a first pair of solid state controlled rectifiers for selective pulse frequency modulated motor operation in CCW or CW rotational direction, commutating circuit means for interruption of power from said first pair of controlled rectifiers, including a capacitor and at least one inductance, a second pair of solid state controlled rectifiers, signal supplying control means for selective and timed capacitor charge reversal, controlled



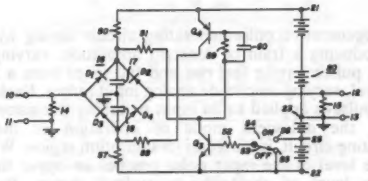
rectifier triggering, steering of the commutating circuit output to the appropriate one of the first pair of controlled rectifiers, and lockout of the respective triggering signals.

3,573,501

SOLID STATE SWITCHING CIRCUITS

Max H. Diehl, Manlius, N.Y., assignor to General Electric Company

Filed Apr. 22, 1968, Ser. No. 723,024
Int. Cl. H03b 17/00
U.S. Cl. 307—257 6 Claims



A solid state switching circuit including a diode bridge network is operated by DC control currents. One pair of opposite points of the bridge network is connected in the line to be switched. The other pair of opposite points of the bridge network is connected to a control circuit which produces conduction or nonconduction simultaneously in the diodes. Unidirectional currents from the control circuit, flowing in the bridge circuit, flow in opposite directions in both the input and output circuit of the line to be switched and are balanced out.

3,573,502

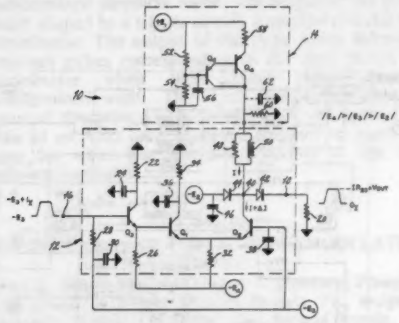
SUBNANOSECOND CURRENT PULSE GENERATOR

David T. Kan, Albany, Calif., assignor to Monsanto Company, St. Louis, Mo.

Filed Dec. 24, 1968, Ser. No. 786,557
Int. Cl. H03k 5/12
U.S. Cl. 307—263 7 Claims

A pulse generator circuit including a pair of switching transistors and a constant current source coupled to an output terminal by a diode poled to deliver current to the load resistor in response to the switching of the transistor. While the pulse generating circuit is in its standby condition and during a predetermined portion of the switching cycle,

the diode isolates the load circuit from the switching circuit. Actuation of the switching transistor and subsequent



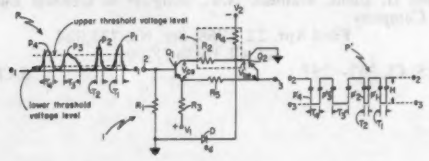
conduction of the diode produces a pulse waveform having the steep leading and trailing edges at the output terminal.

3,573,503

PULSE GENERATING CIRCUIT

Frank G. Macey, Shrewsbury, Mass., assignor to Sylvania Electric Products Inc.

Filed Jan. 31, 1969, Ser. No. 795,548
Int. Cl. H03k *3/295*
U.S. Cl. 307—264 **6 Claims**



A regenerative pulse-generating circuit having hysteresis for producing a train of constant amplitude, varying width output pulses having fast rise and fall times from a train of low level, varying amplitude analog input pulses. Each analog input pulse is applied to an input switching transistor which, during the quiescent mode of operation of the pulse generating circuit, is biased in its saturation region. When the voltage level of the input pulse reaches an upper threshold voltage level of the pulse-generating circuit, the input switching transistor starts to rapidly turn off and causes the voltage at the base of an emitter-follower output transistor coupled thereto to rapidly change. When this voltage reaches a predetermined value, it is clamped to that value by means of a diode. The emitter-follower output transistor, which is biased in a low conduction state during the quiescent mode of operation of the pulse-generating circuit, is operated in a high conduction state and the voltage level at the emitter thereof changes from its quiescent value.

When the voltage level of the input pulse reaches a lower threshold voltage level of the pulse-generating circuit, the input switching transistor and the output transistor are switched to their quiescent operating states whereby the voltage level at the emitter of the output transistor returns to its original value. Because of the presence of regeneration between the transistors, the transistors are switched from one state to another in a very rapid fashion.

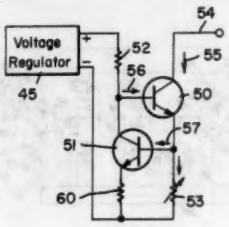
3,573,504

TEMPERATURE COMPENSATED CURRENT SOURCE

David Roy Breuer, Malibu, Calif., assignor to TRW Inc., One Space Park, Redondo Beach, Calif.

Filed Jan. 16, 1968, Ser. No. 698,238
Int. Cl. G05f *1/40*
U.S. Cl. 307—270 **3 Claims**

A current source which is substantially independent of variations of temperature. Thus the current source may be made either to have a linear dependence upon changes of temperature or, by the simple addition of a resistor, may be made substantially independent of temperature variations. Since the current source consists only of transistors of one conductivity type and resistors, it is ideally suited for



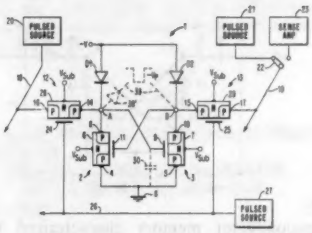
manufacture in the form of a monolithic integrated circuit. The invention described herein was made in the performance of work under a NASA contract and is subject to the provisions of Section 305 of the National Aeronautics and Space Act of 1958, Public Law 85-568.

3,573,505

BISTABLE CIRCUIT AND MEMORY CELL

Fritz H. Gaensslen, Yorktown Heights, and Dominic P. Spampinato, Ozone Park, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 15, 1968, Ser. No. 744,903
Int. Cl. H03k *3/26*
U.S. Cl. 307—279 **16 Claims**

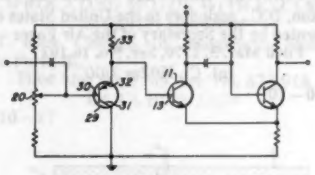


A memory cell in which the load devices thereof are unidirectional devices such as diodes, In the cell, where the storage devices are PNP or NPN devices, the diode load devices are disposed in the circuit such that the PN junctions of the diodes are backward biased. The storage devices, which are cross-coupled, and the diode load devices are connected at nodes to which gated drivers are also connected for the purpose of applying appropriate voltages to the nodes and, therefore, to the gate electrodes of the storage devices to change the conducting state of the storage devices during an active state. The gated drivers when turned on, also provide a portion of a current path to detect the conducting state of one or the other of the storage devices. In a quiescent state, the diode load devices in conjunction with a backward-biased PN junction portion of the OFF storage device form a nonlinear voltage divider which, because of their relative impedances, apply a voltage at the node of the OFF storage device to which the gate of the ON storage device is connected which maintains that storage device in the ON condition during the quiescent state. A bistable circuit and a nondestructive readout memory array are also disclosed.

3,573,506
TEMPERATURE STABILIZED MONSTABLE MULTIVIBRATOR

Francis E. Morris, 3436 Elliott St., San Diego, Calif.

Filed May 8, 1968, Ser. No. 727,448
Int. Cl. H03k *3/26*
U.S. Cl. 307—273 5 Claims

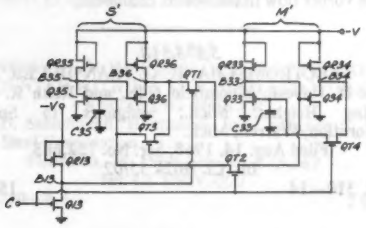


A modification to a conventional monostable multivibrator circuit is disclosed for minimizing variations in the width of output pulses produced by the circuit, in particular, pulse width variations resulting from changes in parameters of the transistors resulting from temperature variations. Stabilization is achieved by utilizing an additional transistor as a leg of a voltage divider for supplying bias voltage to the transistors of the multivibrator. When the additional transistor has a temperature response similar to that of the multivibrator transistor, a circuit can be constructed that compensates for changes in parameters of the multivibrator transistors by changing their bias voltage. Two embodiments of the instant invention are disclosed. One utilizes a third transistor that is identical in type to the transistor of the multivibrator while the other uses a transistor of complementary symmetry.

3,573,507
INTEGRATED MOS TRANSISTOR FLIP-FLOP CIRCUIT

Hung L. D. Eng, Ottawa, Ontario, Canada, assignor to Northern Electric Company Limited, Montreal, Quebec, Canada

Filed Nov. 8, 1968, Ser. No. 774,241
Claims priority, application Canada, Sept. 11, 1968, 029,748
Int. Cl. H03k *3/286*
U.S. Cl. 307—279 5 Claims



A circuit capable of *J–K* operation and composed of enhancement-type MOS transistors adapted for integrated circuits. The total gate area required for the transistors is reduced by minimization of series connection of two or more of the inverter transistors, which are required to have a low resistance compared with the transistors that perform a load resistor function.

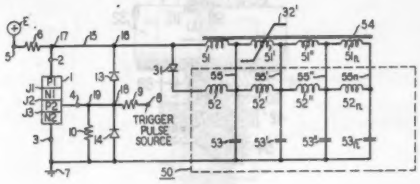
This avoidance of series connection is achieved by connecting one of the cross-connected feedback paths of each flip-flop assembly through a transmission transistor gated by the clock pulses.

3,573,508
THYRISTOR SWITCH CIRCUIT

William B. Harris, Bernardsville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Sept. 27, 1968, Ser. No. 763,262
Int. Cl. H03k *335, 35, 17/56*
U.S. Cl. 307—284 5 Claims

Heretofore, when a thyristor switch circuit has employed a resonant circuit, including a series-connected inductor and capacitor, for producing a cycle of ringing current which is used for turning off the thyristor, the minimum pulse width that could be obtained was usually greater than twice the recovery time of the thyristor. It has now been discovered that an approximately 50 percent reduction in this minimum pulse width can be effected by connecting a diode in series with the inductor-capacitor combination and by placing a saturable reactor in shunt across the serially connected diode

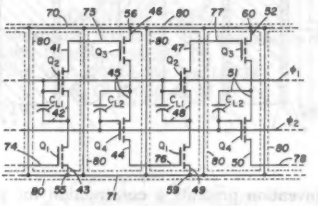


and inductor. The diode is so poled as to prevent the initial discharge current produced by the capacitor from flowing through the inductor and forces this current to flow through the saturable reactor. Since the saturable reactor is biased to present a low inductive impedance to the first half-cycle of ringing current, it reduces the duration of this first half-cycle to a very short period of time. This provides a substantially greater ratio of turnoff time to pulse width and thereby produces a much narrower pulse for a given turnoff time.

3,573,509
DEVICE FOR REDUCING BIPOLAR EFFECTS IN MOS INTEGRATED CIRCUITS

Robert Hudson Crawford, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Sept. 9, 1968, Ser. No. 758,283
Int. Cl. H01l *19/00*
U.S. Cl. 307—303 6 Claims



A capacitive pullup, two-phase shift register formed by P-channel enhancement mode MOS transistors is disclosed as the embodiment of the invention. As a result of the capacitive coupling, a P-type diffusion which is normally negative will go positive in some instances. This forward biases the normally reverse biased PN junction between the P-type diffusion and the N-type substrate, injecting carriers into the substrate which may be collected at any other negatively biased P-type diffusion which then functions as the collector of a bipolar transistor. This collector current may result in the loss of stored logic information. To minimize these effects, a P-type collector diffusion is disposed adjacent to each potential emitting diffusion to collect the spurious carriers injected into the substrate before they cause the loss of stored data.

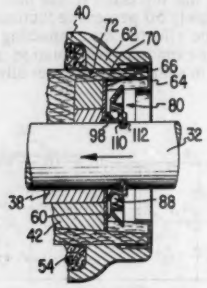
3,573,510
CUSHION THRUST WASHER

Charles W. Otto, DeKalb, Ill., assignor to General Electric Company

Filed June 9, 1969, Ser. No. 831,592
Int. Cl. F16c *1/24*
U.S. Cl. 308—132 14 Claims

A unitary, imperforate disclike thrust washer member carried by a dynamo electric machine rotor shaft is annularly recessed on one face with one recess wall slotted at spaced

circumferential positions to form a plurality of flexible spring fingers which extend axially beyond a rigid thrust runner, and



annularly recessed on the opposite face to form a cone-shaped oil pumping surface.

3,573,511

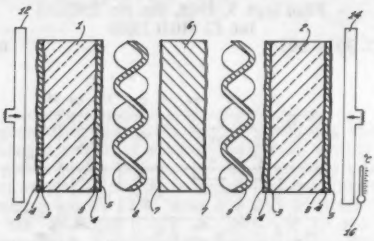
HIGH TEMPERATURE, HIGH VACUUM, DIFFUSION BONDED PIEZOELECTRIC MOTOR SANDIWCH, UTILIZING INTERMEDIATE WAFFLELIKE LAYERS

Don W. Noren, Redwood City, Calif., assignor to Litton Precision Products, Inc., San Carlos, Calif.

Original application Jan. 4, 1968, Ser. No. 696,487, now Patent No. 3,481,014. Divided and this application June 5, 1969, Ser. No. 830,680

Int. Cl. H04r *17/00*

U.S. Cl. 310—8 **5 Claims**



This invention presents a construction for piezoelectric-type motor devices commonly termed "bimorphs" and obtains an improved bimorph that is suitable for operation at high temperatures and in high vacuum environments. The bimorph is constructed of two thin flat piezoelectric layers, each of which is plated on the front and back faces with an electrically conductive material by conventional techniques, such as ion plating. This plating preferably consists of successive layers of chrome, copper, and gold. One face of each element functions as an outer electrode. The middle electrode of the bimorph is a thin flat metal which has physical characteristics which match those of the piezoelectric bodies, suitably molybdenum. The molybdenum sheet is copper plated on both sides. This electrode is sandwiched between the two piezoelectric layers. However, sandwiched between each of the piezoelectric layers and the plated middle electrode is a thin layer of electrically conductive material, suitably gold, having a wafflelike or indented lattice surface configuration. These elements are sandwiched together as indicated and are diffusion bonded together to form a unitary mass. One representative application is the use of the bimorph as a driving mechanism in tuners located within the evacuated regions of microwave tubes, such as the coaxial magnetron. Additionally, because the construction retains its operational characteristics in high vacuum environments without outgassing, the motor mechanism is suitable for application in high vacuum electron tubes and in outer space.

3,573,512

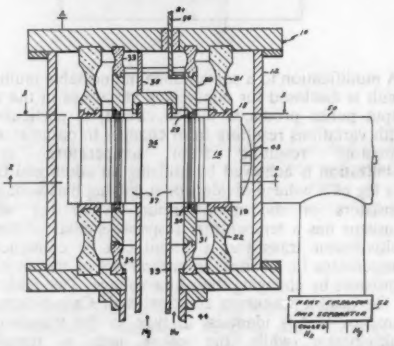
ELECTROFLUID DYNAMIC GENERATOR SYSTEM

Maurice O. Lawson; Hans J. P. von Ohain, Dayton; John A. Decaire, Fairborn, Ohio, and Frank L. Wattendorf, Washington, D.C., assignors to the United States of America as represented by the Secretary of the Air Force

Filed Mar. 3, 1970, Ser. No. 16,102

Int. Cl. H02m *3/00*

U.S. Cl. 310—10 **6 Claims**



In an electrofluid dynamic generator system a plurality of annularly positioned nozzles directing high velocity flow of charged particles toward a collector structure wherein the charges are moved against the electrostatic field by fluid dynamic energy. Vortex chambers are located on each side of the flow with low molecular weight gas forming aerodynamic walls for the conversion section. Electrodes are positioned in the vortex flow to provide a linear increase in voltage along the centerline of the conversion section. The electrodes are shaped so they do not interfere substantially with the vortex flow in the vortex chambers.

3,573,513

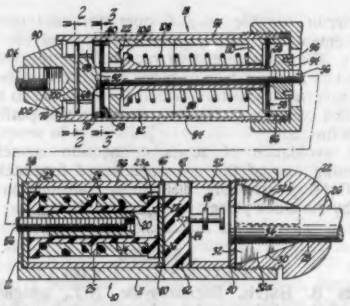
ELECTROMECHANICAL TRANSDUCER

Thomas D. Hayosh, Bloomfield Hills, and Keith R. Jenkin, Sterling Heights, Mich., assignors to Speedring Corporation, Warren, Mich.

Filed Aug. 14, 1968, Ser. No. 752,685

Int. Cl. H02k *35/02*

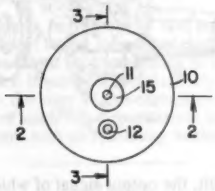
U.S. Cl. 310—14 **15 Claims**



An electromechanical transducer including a coil supporting assembly and an armature supporting assembly detachably connected together. The coil supporting assembly includes a cylindrical casing with an internal shoulder, and a

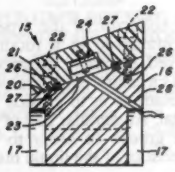
coil winding support member is clamped against the shoulder by an adjustable cap. The armature is mounted on a rod supported on a pair of diaphragm springs for relatively free axial movement but is restrained against radial and rotative movement.

3,573,514
RECIPROCATING MOTOR WITH EXCURSION MULTIPLICATION
Richard T. Race, Chicago, Ill., assignor to Motorola, Inc., Franklin Park, Ill.
Filed May 12, 1969, Ser. No. 823,918
Int. Cl. H02k *33/04*
U.S. Cl. 310—17 **18 Claims**



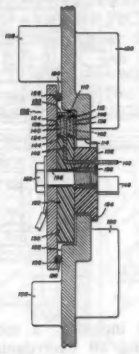
A reciprocating motor for a refrigerator compressor operates in response to alternating current signals applied either to an electromagnet or to a bilayer piezoelectric crystal mounted within the motor housing. The armature of the electromagnet and a plate driven by the bilayer crystal are arranged for limited excursions in an amount which normally would be insufficient to provide sufficient output to the piston of a compressor. The armature or the plate, however, are connected to a compressor piston through a power drive spring which is caused to have a resonant frequency of vibration equal to the frequency at which the armature or the crystal is driven. The drive spring then amplifies the movement of the armature or plate to cause the piston driven thereby to have a substantially greater excursion of reciprocation than the driving armature or crystal, thereby providing sufficient physical piston displacement to operate the compressor.

3,573,515
TRANSDUCER-HOLDING BLOCK ADAPTED TO BE MOUNTED WITHIN A LIQUID-FILLED WORK-ENGAGING ROLLER
Darwin D. Stombaugh, Hammond, Ind., assignor to United States Steel Corporation
Filed Feb. 28, 1969, Ser. No. 803,267
Int. Cl. H01v *7/00*
U.S. Cl. 310—8.3 **2 Claims**



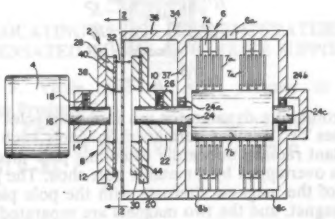
A block for holding an ultrasonic transducer (piezoelectric crystal), adapted to be mounted interiorly of a hollow liquid-filled work-engaging roller, is carried on the roller shaft and has a cap removably secured thereto. The cap has a recess in its block-engaging face, dimensioned to accommodate the transducer. A seal between the engaging faces of the block and cap prevents the liquid with which the roller is filled from coming into contact with the transducer.

3,573,516
RECTIFIER BRIDGE FOR USE WITH AN ALTERNATOR
Russell P. Lyon, East Lake, N.Y., and Paul W. Koenig, Clyde, N.Y., assignors to General Electric Comp.ny
Filed Apr. 23, 1969, Ser. No. 818,681
Int. Cl. H02k *11/00*
U.S. Cl. 310—68 **7 Claims**



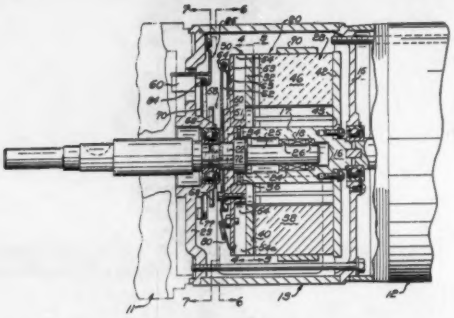
A rectifier bridge assembly is mounted against a heat-receiving surface which may be a housing of an alternator. The bridge assembly includes a plurality of stacks each including an input lead located between junction containing semiconductor elements. A plate overlies the stacks in electrically conductive relation thereto to form a conduction path for rectified current. A dielectric surrounds the semiconductor elements to protect them against contamination.

3,573,517
MAGNETIC DRIVE
Gordon E. Osterstrom, Winnetka, Ill., assignor to Sargent-Welch Scientific Company, Skokie, Ill.
Filed Mar. 2, 1970, Ser. No. 15,733
Int. Cl. H02k *49/06*
U.S. Cl. 310—103 **15 Claims**



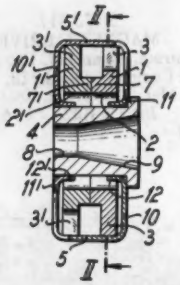
A synchronous magnetic drive for transmission of rotary motion from a driving member to a driven member positioned in spaced-away relation to the driving member, which synchronous magnetic drive is characterized by improved stability, particularly during acceleration. An electrically conductive member is associated with at least one flux path of at least one magnetic circuit in the synchronous magnetic drive. The electrically conductive member is positioned relative to the flux path of the magnetic circuit in a manner wherein a change in flux in that flux path, caused by relative movement between oppositely facing magnetic poles of the driven and driving members, induces a current in the electrically conductive member which, in turn, induces countermagnetic forces to those associated with the change in flux. These countermagnetic forces act as a damper which stabilizes the driven and driving members of the synchronous magnetic drive.

3,573,518
DRIVE MECHANISM
George N. Liles, Southfield, Mich., assignor to Eaton Yale & Towne Inc., Cleveland, Ohio
Filed July 28, 1969, Ser. No. 845,292
Int. Cl. H02k 49/06
U.S. Cl. 310—103 17 Claims



Hoist mechanism including a torque-limiting drive for raising the hoist and an overrunning clutch for directly driving the hoist to lower it. Torque limiting is by a hysteresis clutch having temperature-sensing means for sensing heat caused by clutch slipping.

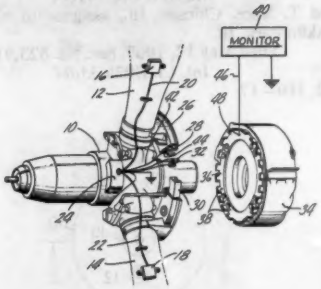
3,573,519
ROTORS FOR ALTERNATORS
Yoshimi Kumazawa, Aichi ken, Nagoya shi, Japan, assignor to Nippon Denso, Kabushiki, Kaisha, Aichi ken, Kariya shi, Japan
Filed Apr. 3, 1969, Ser. No. 813,027
Int. Cl. H02k 21/12
U.S. Cl. 310—156 8 Claims



The rotor of a dynamo for use in motorcycles or the like comprises two annular permanent magnets each having six equidistant radially outwardly extending pole pieces each of which is overlapped by a metallic pole shoe. The pole pieces of one of the magnets alternate with the pole pieces of the other magnet, and the two magnets are separated from each other by one or more ring-shaped distancing members. The magnets, their pole pieces, the pole shoes, the distancing members and the connectors for the pole shoes are embedded in a nonmagnetizable light metal so that the rotor resembles a short cylinder having an axial passage for reception of a drive shaft.

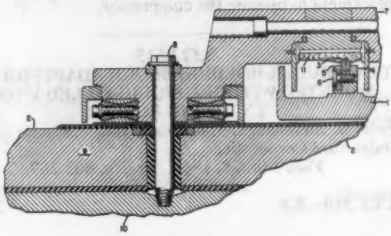
3,573,520
ROTATING BODY HAVING COMBINED POWER GENERATING AND SIGNAL COUPLING SYSTEM
Richard C. Dorshimer, Longmeadow, Mass., assignor to United Aircraft Corporation, East Hartford, Conn.
Original application Jan. 10, 1967, Ser. No. 608,377. Divided and this application Sept. 19, 1969, Ser. No. 870,769
Int. Cl. H02k 19/20
U.S. Cl. 310—168 3 Claims

A rotatable member is disposed for rotation in proximity with a stationary body, the rotatable member having an annular capacitive plate adapted for rotation immediately adjacent a plurality of magnetic teeth on the stationary body, the teeth and the annular plate forming a capacitor for coupling signals between the stationary body and rotatable member. At one point in the annular member is a magnetic head having a winding, the magnetic head passing over successive ones of the magnetic teeth generating electric current which is utilized on the rotating body to operate a



transducer circuit, the output signal of which is coupled back through the capacitive coupling formed by the teeth in the annular surface to monitoring equipment located on the stationary body. The transducer circuit may include a power rectifier and voltage regulator which operates strain gauges, amplifiers and voltage control oscillators. the outputs of the voltage control oscillators may be multiplexed in the mixer prior to returning as a signal through the capacitive coupling.

3,573,521
CONDUCTOR BLADE FOR A LIQUID METAL COLLECTOR
Chester C. Carson, Ballston Spa, and Gerd E. Krulls, Scotia, N.Y., assignors to General Electric Company
Filed Mar. 5, 1970, Ser. No. 16,648
Int. Cl. H02k 29/00
U.S. Cl. 310—219 4 Claims

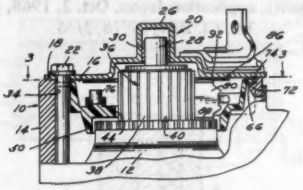


A liquid metal collector of the type having a stationary conductor blade immersed in a rotating volume of liquid metal has improved electrical characteristics through the incorporation of a circumferential groove which is positioned in the conductor blade so as to provide a relatively quiescent area of liquid metal. An annular pad of molybdenum may be positioned in the groove in order to further enhance the electrical characteristics of the liquid metal collector.

3,573,522
DYNAMOELECTRIC MACHINE INCLUDING BRUSH HOLDING MEANS
Alex M. Pentland, Ann Arbor, Mich., assignor to Ford Motor Company, Dearborn, Mich.
Filed Dec. 29, 1969, Ser. No. 888,278
Int. Cl. H01r 39/38
U.S. Cl. 310—239 10 Claims

This disclosure relates to a dynamoelectric machine having brush holding means which comprises essentially a single-

piece brush holder constructed of an insulating material for slidingly receiving brushes that engage a cylindrical portion of a commutator. This brush holder is positioned within the machine by engagement with the stator in such a position that slots positioned therein are located radially outwardly of the cylindrical portion of the commutator. The brushes of the machine are received within these slots so that the brush



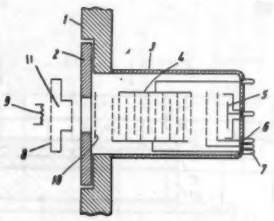
holder does not limit movement of the brushes in an axial direction with respect to the cylindrical portion of the commutator. Axial movement of the brushes is limited by having one surface of each brush positioned closely adjacent to or in engagement with the riser of the commutator and by having another surface of each brush positioned in close proximity to or in engagement with an insulating washer.

3,573,523

VACUUM GAUGE ARRANGEMENT PROVIDED WITH A FLANGE CONNECTION

Gunther Reich, Cologne-Zollstock; Hans-Georg Noller, Walberberg, and Wolfdietrich Schulz, Cologne-Bayental, Germany, assignors to Leybold-Heraeus-Verwaltung G.m.b.H., Cologne-Bayental, Germany

Filed Aug. 28, 1968, Ser. No. 755,925
Claims priority, application Germany, Sept. 7, 1967, L57,383
Int. Cl. G01n *27/62*; H01j *41/00*
U.S. Cl. 313—7 **12 Claims**



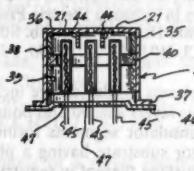
A heat protective electrode positioned between a hot cathode ion source having an ionization chamber and an associated electrode system having an ion collector. The heat protective electrode is connected to a flangelike supporting member which supports the housing in which the electrode system is contained.

3,573,524

MULTI-APERTURED GRID HOUSING AND SHIELDING PLURALITY OF CATHODES

Akio Ohgoshi, Tokyo, and Senri Miyaoka, Kanagawa-ken, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 14, 1969, Ser. No. 815,939
Claims priority, application Japan, Apr. 13, 1968, 43/24,505
Int. Cl. H01j *29/50, 29/82*
U.S. Cl. 313—70C **1 Claim**



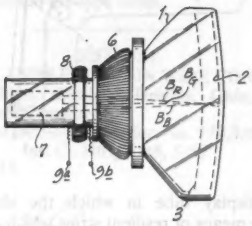
A shielding mechanism for isolating the positively charged neck of a color cathode ray tube from a plurality of cathodes within such neck, in which a steel plate covers the open end of a grid which housed the aforementioned cathodes. The grid also has formed therein separators to eliminate the effects of intercathode electric field reaction which may result from dissimilar potentials of the cathodes.

3,573,525

COLOR PURITY TEMPERATURE COMPENSATION SYSTEM FOR A COLOR PICTURE TUBE

Yuzo Fuse, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 29, 1969, Ser. No. 888,340
Claims priority, application Japan, Dec. 28, 1968, 43/95984
Int. Cl. H01j *29/70*
U.S. Cl. 313—75 **6 Claims**



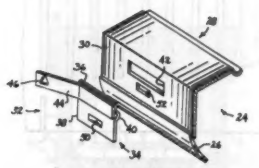
In a color picture tube having an apertured beam selecting grill or mask through which one or more electron beams are made to land on predetermined color phosphors applied to the face plate of the tube, thermal expansion of the grill or mask is compensated for, so as to avoid mislanding of the beam or beams, by providing an auxiliary magnetic deflection means in back of the main magnetic deflection or scanning means and operative in dependence on the operation of the main deflection means to produce magnetic flux in opposition thereto and including a core having a magnetic permeability that decreases with increasing temperature so as to similarly decrease the magnetic flux opposing that of the main deflection means, whereby the effective center of deflection of the beam or beams is shifted rearwardly in response to increasing temperature.

3,573,526

LOCATING DEVICE FOR TEMPERATURE COMPENSATED PARALLAX BARRIER SUPPORTING SYSTEM

Benedict F. Vitale, Auburn, N.Y., assignor to Sylvania Electrics Products Inc.

Filed Dec. 23, 1968, Ser. No. 786,183
Int. Cl. H01j *29/02, 29/32, 29/06*
U.S. Cl. 313—85 **1 Claim**



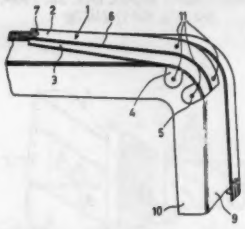
Cooperating means formed between a temperature-compensating member having an expansion loop and a sidewall of a parallax barrier are provided to insure centering of the loop within a preformed opening in the barrier sidewall. The cooperating means comprise protruding portions and matching receiving openings therefor, either of which may be formed on either member with the mating portion formed on the other member.

3,573,527

SHADOW MASK SUPPORTED BY BIMETALLIC SPRING COMPRISING COPLANAR STRIPS WITH DIFFERENT COEFFICIENTS OF EXPANSION

Gerardus Antonius Hafkenscheid; Gerardus Wilhelmus Plukker, and Jan Willem Ruis, Emmasingel, Eindhoven, Netherlands

Filed Feb. 3, 1969, Ser. No. 795,969
Claims priority, application Netherlands, Feb. 8, 1968, 6801741
Int. Cl. H01j *29/02, 29/06, 19/50*
U.S. Cl. 313—85 5 Claims



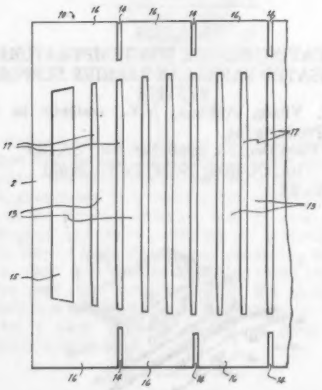
A color display tube in which the shadow mask is suspended by means of resilient strips which consist of strips of metals having different coefficients of expansion, the narrow sides of which are welded together, the welding seam extending along the longitudinal axis of the strip, and the strip upon heating being bent in its plane in such a manner that the mask is moved towards the display screen.

3,573,528

COLOR PICTURE TUBE GRID STRUCTURE WITH NONUNIFORM GENERALLY PARALLEL SLITS

Makoto Maeda, Kanagawa-ken, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Feb. 12, 1969, Ser. No. 798,635
Claims priority, application Japan, Feb. 12, 1968, 43/9043
Int. Cl. H01j *29/06, 29/46, 29/56*
U.S. Cl. 313—85 1 Claim



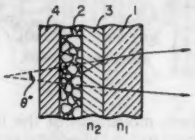
A grid structure for color picture tubes adapted to decrease undesirable deviation of electrons away from the phosphor screen of a color picture tube. The slits between the grid wires are formed narrower at the upper and lower portions and wider in the central portion to increase the fundamental vibration frequency and increase the electron beam transmission factor. The latter grid structure eliminates the deleterious effects of (a) grid vibration caused by accidental impact and (b) earth magnetism.

3,573,529

FACEPLATE OF THIN-WINDOW RECORDING TUBE HAVING INTERMEDIATE SHEET OF SMALLER REFRACTIVE INDEX THAN THE FACE PLATE

Kaoru Tomii, Tokyo, Japan, assignor to Matsushita Electric Industrial Co. Ltd., Osaka, Japan

Filed June 16, 1969, Ser. No. 833,254
Claims priority, application Japan, Oct. 2, 1968, 43/72345
Int. Cl. H01j *29/18, 5/16*
U.S. Cl. 313—92 3 Claims



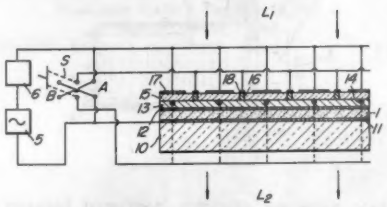
An improved faceplate of a thin-window recording tube having an additional glass sheet interposed between the outermost glass sheet and fluorescent layer. The faceplate offers increased resolution due to minimized diffusion of the output luminescent light with the refractive index of the intermediate glass sheet smaller than that of the outermost glass sheet.

3,573,530

ELECTROLUMINESCENT PANEL DISPLAY DEVICE

Tadao Kohashi, Yokohama, Japan, assignor to Matsushita Electric Industrial Company, Ltd., Osaka, Japan

Filed May 13, 1968, Ser. No. 728,546
Claims priority, application Japan, May 19, 1967, 42/32249
Int. Cl. H01j *1/66, 1/70;* H05j *33/10*
U.S. Cl. 313—108 2 Claims



A luminescent memory and display device which receives visible light or X-rays as an input signal, converts said signal into a variation in DC voltage with an amplifying effect, and displays the corresponding signal in an AC excited luminescent output or stores the signal if required; said device comprising an electroluminescent element, an energy-responsive element such as a photoconductive element, a resistive element, a capacitive element, an AC voltage source and a DC voltage source.

3,573,531

PLASMA PANEL DISPLAY DEVICE

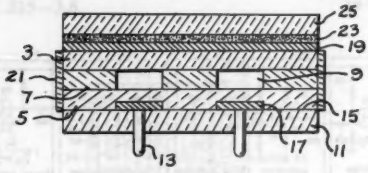
Donald R. Kerstetter, Emporium, and Everett C. Smith, Butler, Pa., assignors to Sylvania Electric Products, Inc.

Filed Mar. 18, 1968, Ser. No. 808,271
Int. Cl. H01j *63/06, 11/00, 15/02*
U.S. Cl. 313—108 3 Claims

A high contrast plasma display device includes transparent and opaque insulator layers spaced and bonded by a plurality of spaced opaque insulator segments forming a plurality of cavities. An insulator substrate having a plurality of spaced conductors on the surface thereof in registry with the cavities and electrical connectors embedded therein is bonded to the opaque insulator layer while a transparent electrode layer is

affixed to the transparent insulator layer. An ionizable gas is disposed within the cavities whereby energization of certain conductors alters the device from an opaque to a visual display.

Also, the high contrast plasma display device is fabricated by a process which includes affixing the spaced conductor to a substrate, bonding an opaque insulator layer to the



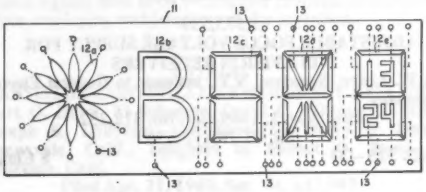
substrate and spaced conductors, attaching spaced opaque insulator segments to a transparent insulator layer, bonding the segments to the opaque insulator layer forming cavities in registry with the spaced conductors, affixing a transparent electrode to the transparent insulator layer, and disposing an ionizable gas within the cavities whereby the device appears opaque until energized to provide a visual display.

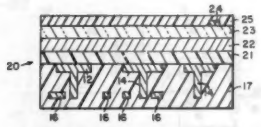
3,573,532

ELECTROLUMINESCENT DISPLAY DEVICE HAVING ETCHED CHARACTER ELECTRODES

Gerald Boucher, Hudson, assignor to Sanders Associates, Inc., Nashua, N.H.

Filed May 22, 1968, Ser. No. 731,191
Int. Cl. H01j *7/42;* **H01k** *1/60*
U.S. Cl. 313—109.5 **4 Claims**





An electroluminescent display device is provided, in which a substrate of the display is comprised of character electrodes, external connecting means for facilitating connections to external apparatus and a plurality of interconnecting means between the character electrodes and external connecting means. The character electrodes, interconnecting means and external connecting means form one integral unit, with the display device itself being a monolithic structure.

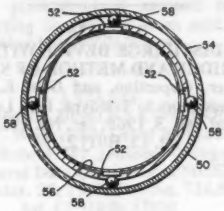
3,573,533

GUN-SUPPORTING CYLINDER CENTERED IN ART NECK BY SPRINGS CONNECTED INTERNALLY OF CYLINDER

Bent Gronlund, Vista, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Nov. 12, 1968, Ser. No. 774,731
Int. Cl. H01j *1/96, 19/50, 39/02*
U.S. Cl. 313—288 **2 Claims**

Several embodiments of a novel electron-gun-supporting arrangement are illustrated. Generically, the gun-support arrangements provide for openings in an elongated cylinder which houses various aspects of the electron gun. Spring metal elements secured to the inner surface of the cylinder have upraised deformations to project through the holes in



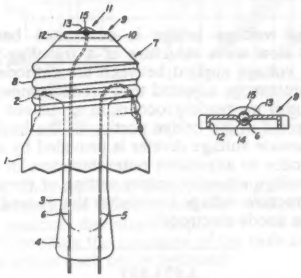
this cylinder and engage the inner surface of an elongated glass tube or neck portion which houses the electron gun in conventional cathode-ray-type tubes.

3,573,534

LAMP BASE AND LEADING-IN WIRE CONNECTION

Leroy G. Leighton, Highland Heights, Ohio, assignor to General Electric Company

Filed Oct. 28, 1968, Ser. No. 770,939
Int. Cl. H01j *5/48, 5/50*
U.S. Cl. 313—318 **6 Claims**



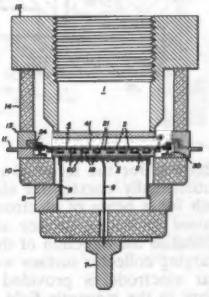
The contact of a conventional screw-type electric lamp base is provided with a side apertured dome-shaped boss for engaging a socket contact and a groove extending from and communicating with the side aperture for accommodation a leading-in wire threaded through the side aperture from the interior of the base and affixed to the contact within the groove.

3,573,535

HIGH-FREQUENCY ELECTRONIC TUBE HAVING NOVEL GRID MOUNTING

Robert M. Hughes, Owensboro, Ky., assignor to General Electric Company

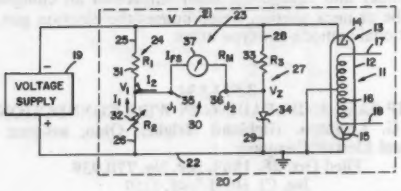
Filed Nov. 12, 1968, Ser. No. 774,771
Int. Cl. H01j *13/46, 17/04*
U.S. Cl. 313—348 **8 Claims**



A high-frequency electron tube having a novel grid mount is provided to inhibit mechanical distortion of the grid at high

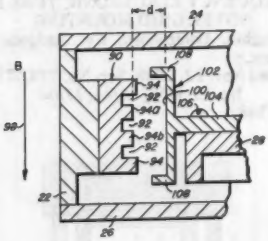
temperature. The shape and material selection of the grid support allows the grid to expand and contract at a different rate than the envelope in which it is mounted without damaging the grid.

3,573,536
ELECTRON DISCHARGE DEVICE WITH INTEGRAL VOLTAGE BRIDGE AND METHOD OF SETTING SAME
James L. Palmer, Cupertino, and Gene E. Tallmadge, Los Altos, Calif., assignors to Teledyne, Inc., Los Angeles, Calif.
Filed Feb. 3, 1969, Ser. No. 796,133
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 8 Claims



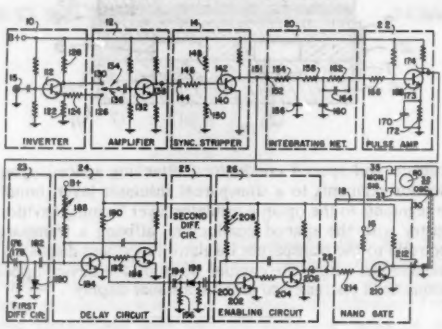
An internal voltage bridge is connected between the cathode and slow wave structure of a traveling-wave tube whereby the voltage applied between the cathode and slow wave structure can be adjusted to a predetermined value by adjustment until no reading occurs in a current measuring device connected in the bridge portion of the bridge circuit. An internal anode voltage divider is provided by connecting anode electrodes to adjustable potentiometers in one leg of the voltage bridge whereby proper setting of the cathode to slow wave structure voltage establishes the desired voltage at the respective anode electrodes.

3,573,537
COLLECTOR ELECTRODE FOR CROSSED FIELD TRAVELING WAVE DEVICE
Merle R. Boyd, Auburndale, Mass., assignor to Raytheon Company, Lexington, Mass.
Filed June 2, 1969, Ser. No. 829,387
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 10 Claims



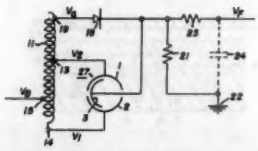
A collector electrode for the terminal region of devices having parallel substantially coextensive electrodes defining an interaction path for a beam of electrons is disclosed to provide an optimized collecting surface along a reference plane defined parallel to the direction of the magnetic field. A progressively varying collector surface with respect to the opposing coplanar electrode is provided to substantially match the variations in the magnetic field intensity thereby effectively influencing the electric field and velocity of the electrons in the collection region.

3,573,538
GATING CIRCUIT FOR SELECTING SYNCHRONIZATION PULSES TO TRIGGER AN OSCILLOSCOPE
Roger A. Swanberg, Bensenville, Ill., assignor to Motorola, Inc., Franklin Park, Ill.
Filed May 9, 1969, Ser. No. 823,409
Int. Cl. H01j *29/70*
U.S. Cl. 315—18 5 Claims



The oscilloscope triggering circuit translates a composite video television signal to derive selected synchronization pulses which are used to trigger the horizontal sweep of an oscilloscope trace so that waveforms applied to the vertical input of the oscilloscope and which occur in time relation with the selected pulses are displayed thereon.

3,573,539
ADJUSTABLE FOCUS VOLTAGE SUPPLY FOR TELEVISION RECEIVERS
John W. Lister, Syracuse, N.Y., assignor to General Electric Company
Filed Apr. 1, 1969, Ser. No. 812,252
Int. Cl. H01j *29/56*
U.S. Cl. 315—31 8 Claims

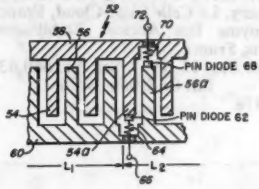


An improved adjustable focus voltage supply for television receivers comprising a variable differential capacitor having at least two fixed plates and a movable plate. The fixed plates are coupled across a portion of the primary winding of the horizontal flyback transformer of the receiver. A diode rectifier has one terminal connected to the movable plate of the differential capacitor and a remaining terminal connected to a point on the winding which, during operation, normally generates pulses of greater amplitude than the points to which the fixed plates of the differential capacitor are connected. An output terminal for deriving the desired variably controlled DC focus voltage is connected to the juncture of the diode rectifier and the movable plate of the differential capacitor. The fixed plates of the differential capacitor are connected to spaced points on the primary winding and, in the illustrated embodiment, the connections straddle the point on the winding which is maintained at alternating current ground reference potential during normal operation. Additionally, the output terminal is connected through a load resistor to a source of alternating current ground reference potential.

3,573,540
MICROWAVE TRAVELING WAVE DEVICE WITH ELECTRONICALLY SWITCHED INTERACTION CHARACTERISTICS

John M. Osepchuk, Concord, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed July 1, 1969, Ser. No. 838,148
Int. Cl. H01j *25/34*
U.S. Cl. 315—3.5 16 Claims

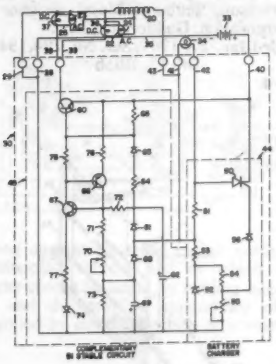


A microwave traveling wave device is disclosed with means for selecting and controlling the optimum efficient interaction characteristics between the electron beam and periodic slow wave propagating circuit, particularly in the exchange of energy with the backward wave components of the beam. The device provides in an integral embodiment for pulsed or continuous wave as well as dual mode operation with high and low operating currents. Electronically actuated means to control the electrical and propagation characteristics are incorporated in combination with the electrode structures bounding the interaction region, means for electron beam interception, as well as means for controlling the phase shift of the electromagnetic energy waves on the periodic slow wave circuit. Tunable sideband spurious signals have been measurably reduced in microwave devices employing embodiments of the invention.

3,573,541
TRANSISTOR-CONTROLLED EMERGENCY EXIT UNIT

Robert O. Dunn, El Sobrante; David C. Wilton, Los Altos; Joseph R. Dydynski, Cupertino, and Jerry D. Haney, Sunnyvale, Calif., assignors to Robert O. Dunn, El Sobrante, Calif.

Filed Apr. 21, 1969, Ser. No. 817,997
Int. Cl. H05b *39/06*, *43/00*
U.S. Cl. 315—87 16 Claims

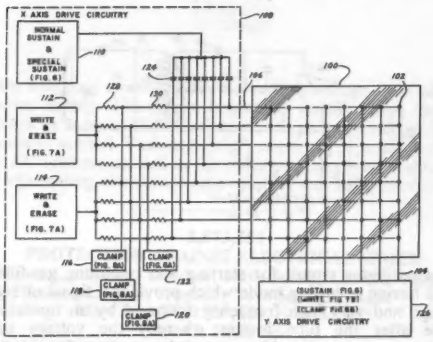


A changeover device for an emergency exit unit having lamps with AC filaments normally operated by a main power supply and normally unenergized DC filaments for operation by a standby battery, which is normally kept charged by a charger circuit. A transistor circuit, when conductive, sends power from the battery to the DC filaments, but the circuit provides for reverse-biasing the base of the transistor while the main power supply is on. An electric charge is created and stored while the main power supply is on, and upon discharge sends bias voltage to the transistor to make it conductive. Self-holding means is energized by the same discharge through said transistor, for retaining the connection between the battery and the DC filaments, and the self-holding means is released when the voltage of the battery drops a predetermined amount below normal, thereby disconnecting the battery from said DC filaments and preventing further battery discharge.

3,573,542
GASEOUS DISPLAY CONTROL

William N. Mayer, White Bear Lake; Richard V. Bonin, Jr., St. Paul, and Robert W. Johnson, Minneapolis, Minn., assignors to Control Data Corporation, Minneapolis, Minn.

Filed Mar. 28, 1968, Ser. No. 716,877
Int. Cl. H05b *37/00*
U.S. Cl. 315—169 11 Claims

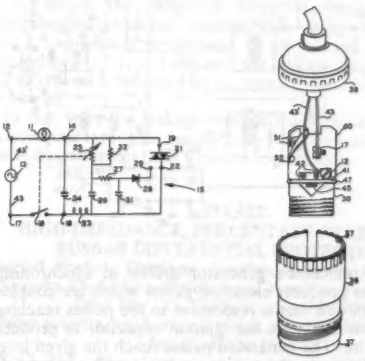


A method and apparatus for controlling the lighting of cells, the sustaining of lit cells, and the extinguishing of lit cells in a gaseous discharge display of the type where electrodes controlling the condition of the cells are insulated from the gas within each cell is disclosed.

3,573,543
VARIABLE LIGHT INTENSITY LAMP SOCKET HAVING SEMICONDUCTOR MOUNTED ON HEAT SINK THERMALLY ISOLATED FROM LAMP BASE

Melvyn B. Grindstaff, Dial-A-Lite Co., Professional Bldg., Bartlesville, Okla.

Continuation-in-part of application Ser. No. 558,784, June 20, 1966, now abandoned. This application Feb. 10, 1969, Ser. No. 797,882
Int. Cl. H05b *37/02*; G05f *1/00*
U.S. Cl. 315—194 8 Claims



A solid state controllable current conducting semiconductor of a variable light intensity control circuit is mounted on a heat sink member which is positioned adjacent

one end of an electrically and thermally insulating support member. The opposite end of the support member is secured to the insulating disc at the base of the lamp receiving shell of the lamp socket. The heat sink member is shaped to provide structural support and to increase the surface area thereof.

3,573,544

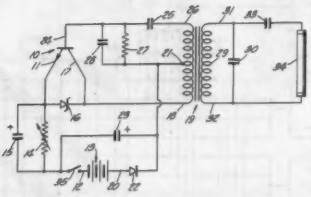
A GAS DISCHARGE LAMP CIRCUIT EMPLOYING A TRANSISTORIZED OSCILLATOR

Jerome Zonis, Ontario, and Everett R. Eu Daly, Riverside, Calif., assignors to Energy Electronics, Ontario, Calif.

Continuation of application Ser. No. 624,764, Mar. 21, 1967, now abandoned. This application May 21, 1969, Ser. No. 835,864

Int. Cl. H05b *41/232, 41/233, 41/29*

U.S. Cl. 315—206 **13 Claims**



An oscillator circuit for starting and operating gas-filled tubes having a starting mode which provides a signal of high voltage and very high frequency followed by an operating mode after the tube ionizes whereby the voltage and frequency are considerably reduced, but current through the tube is increased. In the operating mode, the impedance of the secondary is substantially the ohmic resistance of the tube so that overall efficiency is very high.

3,573,545

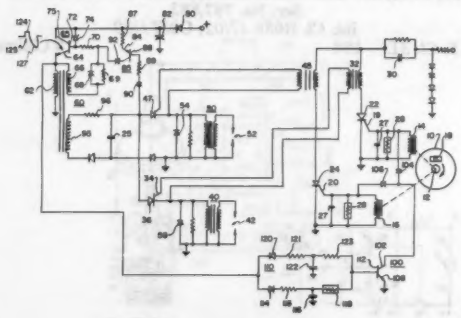
CAPACITOR DISCHARGE IGNITION SYSTEM HAVING CIRCUIT MEANS FOR CONTROLLING THE SPARK ADVANCE

William J. Warner, Schaumburg, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Aug. 22, 1969, Ser. No. 852,313

Int. Cl. F02p *5/08;* **H05h** *41/392*

U.S. Cl. 315—209CD **7 Claims**



A variable reluctance generator driven in synchronism with the engine produces electrical pulses which are coupled to a detector circuit that is responsive to the pulses reaching a given level to discharge the ignition capacitor to produce an ignition pulse. The generated pulses reach the given level in a timed relation to the engine r.p.m. in order to provide spark advance for the ignition system. A transistor is connected between the detector circuit and ground for shunting a portion of the generated pulses. Upon initial operation of the engine, a bias circuit connected to the control electrode of the transistor biases the transistor into conduction to shunt a portion of the pulses thereby reducing the sensitivity of the detector circuit so that the ignition timing remains constant during the initial operation. Subsequently, circuit biases the transistor out of conduction returning full sensitivity to the level detector for providing electronic spark advance.

3,573,546

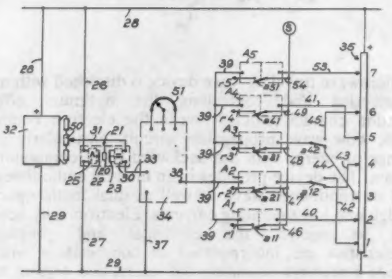
TEMPLATE COPYING APPARATUS

Charles S. Hemery, La Celle Saint-Cloud, France, assignor to Societe Anonyme Des Anciens Etablissements Charles Berthiez, Paris, France

Filed Aug. 15, 1967, Ser. No. 660,638

Int. Cl. G05b *19/36*

U.S. Cl. 318—578 **9 Claims**



The invention relates to machining a workpiece, copying a template in two dimensions. The template is sensed by a copy head assembly, the assembly comprising a copy head moving with the tool, and a template follower movably mounted in the copy head. Deviation of the follower within the copy head in any direction produces a signal voltage, proportional to the magnitude of the deviation, which is compared with a series of reference voltages. The magnitude of the deviation, regardless of the direction, as determined by the voltage comparison, determines the direction of movement of the copy head and the tool.

3,573,547

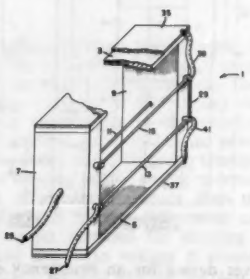
METHOD OF AERODYNAMICALLY EJECTING IONS

Paul B. Fredrickson, Sudbury, Mass., assignor to Augion-Unipolar Corporation, Guilderland, N.Y.

Filed Jan. 27, 1969, Ser. No. 794,154

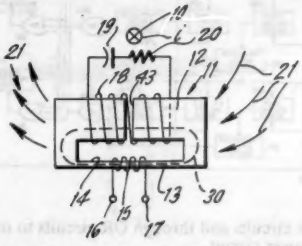
Int. Cl. H05b

U.S. Cl. 317—4 **9 Claims**



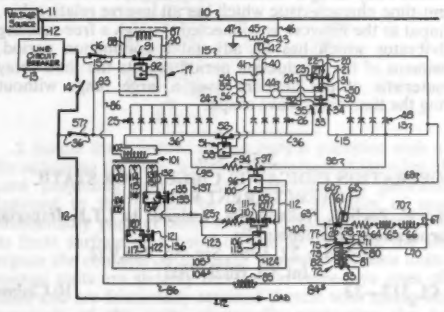
Discloses the method of aerodynamically ejecting and liberating on the outboard output side of an ion device a predetermined amount, optionally ranging from minimum to maximum, of the ions generated on the inboard output side of said ion device through discrete, electrode-configuration disposition and application of magnitude-fixed, DC voltage between the electrodes.

3,573,548
CURRENT ZERO ANTICIPATING DEVICE
Felix H. Bachofen, Oberentfelden, Switzerland, assignor to I.T.E. Imperial Corporation, Philadelphia, Pa.
Filed Nov. 18, 1969, Ser. No. 877,774
Int. Cl. H02h 3/00
U.S. Cl. 317—11 8 Claims



A magnetic circuit consists of a large-area unsaturable section which is in closed series relation with a small-area saturable section. The circuit is located with respect to a current conductor so that the magnetic flux of the conductor flows through the large-area and small-area sections in parallel. The large-area section has an air gap and receives a winding which is closed through a resistance-capacitance circuit. The circulating flux induced in the winding is related to the rate of change of current in the adjacently positioned conductor and is phase shifted in a leading direction. An output winding on the saturable section has output pulses generated therein at times leading the current zero in the conductor by a fixed amount.

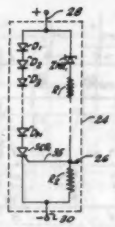
3,573,549
ELECTRICAL SYSTEM INCLUDING CAPACITORS
Herman B. Wolf, Charlotte, N.C., assignor to R. H. Bouligny, Inc., Charlotte, N.C.
Filed May 9, 1969, Ser. No. 823,470
Continuation-in-part of Ser. No. 508,974, Nov. 22, 1965, Pat. No. 3,457,459.
Int. Cl. H02h 7/16
U.S. Cl. 317—12 3 Claims



An alternating current electrical circuit having a bank of capacitors connected therein and in which the voltage appearing on the circuit is varied by varying interconnection of capacitors and the possible appearance of resonance effects is controlled by interconnection of a resistor with the capacitors.

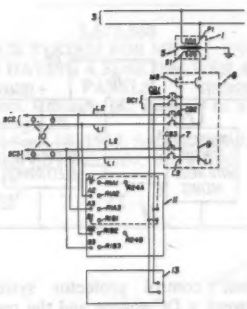
3,573,550
AUTOMATICALLY RESETTING TRANSIENT PROTECTION DEVICE
Louis P. Baker, Jr., Buena Park, Calif., assignor to M & T Chemicals, Inc., New York, N.Y.
Filed Mar. 7, 1969, Ser. No. 805,257
Int. Cl. H02h 3/00, 7/00, 5/00
U.S. Cl. 317—16 17 Claims

Apparatus for protecting electrical circuitry from voltage transients in a power supply or the like connected to the circuitry. A plurality of diodes and a silicon controlled rectifier are connected in series across the output of the power supply. The silicon controlled rectifier is triggered by a predetermined transient voltage level, and the output voltage of the power supply is clamped at the sum of the forward voltage drops of the diodes and controlled rectifier, the



sum being set above the normal output voltage level of the power supply. The silicon controlled rectifier then commutates as soon as the transient ceases and the voltage level drops to normal. Various configurations are provided for DC or AC systems, as well as for remote sensing, and additional compensating circuits are employed for various applications.

3,573,551
PROTECTION AGAINST ELECTRICAL SHOCK
Richard C. Sircom, Windsor, Nova Scotia, Canada, assignor to Eastech Limited, Windsor, Nova Scotia, Canada
Filed June 16, 1969, Ser. No. 833,463
Int. Cl. H02h 9/00
U.S. Cl. 317—17 13 Claims



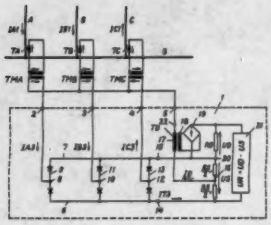
To reduce the danger of electrical shock in two-wire nongrounded electrical systems, the leakage current from line L1 to ground is balanced by an injected current from ground to line L1, and similarly the leakage current from line L2 to ground is balanced by an injected current from ground to line L2.

In this way, the leakage current from line L1 to ground cannot pass through a human body from ground to L2, since the leakage current form a closed current loop.

3,573,552
HIGH-IMPEDANCE, PERCENTAGE-STABILIZED BUSBAR DIFFERENTIAL PROTECTION
Thorleif Forfod, Dingtuna, Sweden, assignor to Allmanna Svenska Elecktriska Aktiebolaget, Vasteras, Sweden
Filed Mar. 27, 1969, Ser. No. 810,991
Claims priority, application Sweden, Apr. 24, 1968, 5483/68
Int. Cl. H02h 3/16
U.S. Cl. 317—18 2 Claims

A relay device operating in response to abnormal conditions in a line includes an arrangement for deriving from the line a current proportional to the current in the line. One terminal of this current deriving device is connected to

the midpoint of a pair of rectifiers connected in series. The other terminal is connected to the midpoint between resistances of equal value connected in series with the pair of rectifiers. In the connection between the midpoint of the resistances and the terminal of the current deriving device is



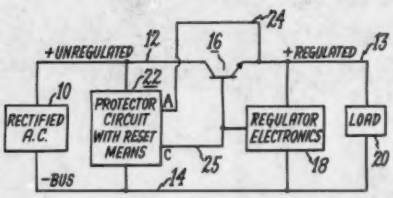
arranged the primary of a transformer. The secondary of this transformer through a full-wave rectifier feeds the relay in parallel with a resistance. The arrangement is such that the relay is fed with the difference between the voltage across the latter resistance and the voltage across the two equal resistances.

3,573,553

POWER SUPPLY PROTECTOR WITH RESET MEANS

Gerhard O. Mietz, Somersworth, N.H., assignor to General Electric Company

Filed June 10, 1968, Ser. No. 735,827
Int. Cl. H02h *3/24, 5/00*
U.S. Cl. 317—22 4 Claims



An electronic control protector system electrically positioned between a DC source and the regulator controls of a DC voltage regulator to reduce conduction of the regulator transistor when the current drawn to the load becomes excessive. The electronic control includes a bypass transistor maintained nonconducting in normal operation. Excess current flow, as indicated by a voltage drop across the load, causes the bypass transistor to conduct and reduce conduction of the regulator transistor. Reset means are provided to provide a short pulse to cut off the bypass transistor allowing normal operation of the regulator. If excess current is still flowing, the bypass transistor will again be rendered conducting to reduce conduction of the regulator transistor.

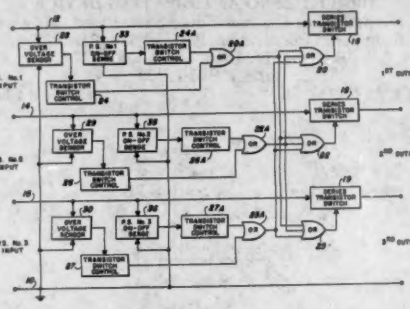
3,573,554

MULTIPLE POWER SUPPLY OVERVOLTAGE AND INTERLOCK CONTROLLED CUTOFF

Donald J. Theobald, La Jolla, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed July 1, 1969, Ser. No. 838,129
Int. Cl. H02h *3/24, 3/20*
U.S. Cl. 317—31 5 Claims

In plural power circuits, all circuits are shut down in case of abnormal high or low voltage on any one of the several circuits. Over and under voltage sensors are connected



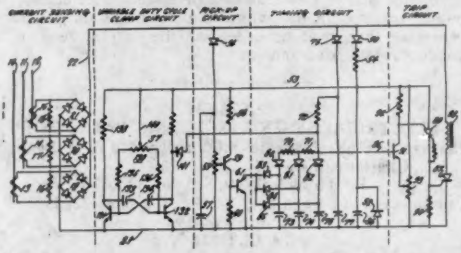
across the circuits and through OR circuits to on-off switches in each power circuit.

3,573,555

TIME DELAY EXTENDER FOR STATIC RELAYS

James W. Lipnitz, Cherry Hill, N.J., assignor to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed Feb. 10, 1969, Ser. No. 797,966
Int. Cl. H01h *47/18*
U.S. Cl. 317—33 6 Claims



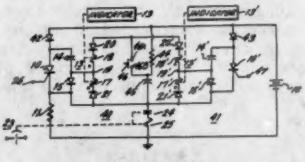
A static relay using a resistance-capacitance network has a current-time characteristic which has an inverse relationship. The input to the network is connected through a free-running multivibrator which has an adjustable conduction period. Adjustment of the conduction period adjusts the time delay characteristic of the network over a large range without altering the time delay wave shape.

3,573,556

OPERATION INDICATOR CIRCUIT FOR STATIC OVERCURRENT RELAYS

Stanley E. Zocholl, Holland, Pa., assignor to I.T.E. Imperial Corporation, Philadelphia, Pa.

Filed May 22, 1969, Ser. No. 826,932
Int. Cl. H02b *7/00*
U.S. Cl. 317—33 10 Claims



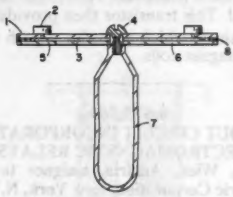
An operation indicator circuit for static overcurrent relays including a normally charged capacitor, discharge of which through a first polarity sensitive indicating circuit provides an indication of an overcurrent condition in electrical equipment and discharge of which through a second polarity sensitive indicating circuit after the overcurrent condition has been corrected provides an indication of the absence of an overcurrent condition.

3,573,557

PRINTED CIRCUIT PROVIDED WITH COOLING MEANS

Daniel W. Riggs, Huntsville, Ala., assignor to the United States of America, as represented by the Secretary of the Army

Filed Feb. 6, 1970, Ser. No. 9,300
Int. Cl. H02b 1/00; H05k 1/02
U.S. Cl. 317—100 2 Claims



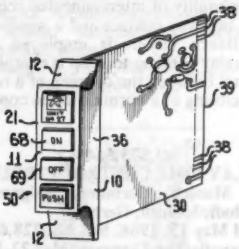
A printed circuit having a board disposed for the support of disposed components and provided with channels extending from a central point to outlet holes in the board at positions of the components. A plate is secured to the board to enclose the channels and provide conduit communication between the outlet holes and a coolant storage bottle. The size of the ports and the width of the channels control the amount of coolant flowing from the bottle to the components for augmenting their current carrying capacity.

3,573,558

PRINTED CIRCUIT CARD HOLDER WITH CONTROL AND DISPLAY UNITS

Frank Draper Babcock, Eau Gallie, Fla., assignor to Radiation Incorporated, Melbourne, Fla.

Filed June 9, 1969, Ser. No. 831,672
Int. Cl. H02b 1/62
U.S. Cl. 317—101 7 Claims



A handle for a printed circuit card is provided with a slot for accepting the card, with keyed contacts at the edge of the card projecting into the slot. The card is permanently fastened to the handle by rivets. A plurality of spaced, substantially parallel holes extend through the handle from its front surface to a point of intersection with the slot to expose the contacts on the card. Separate indicator units and control units are slidably received in respective ones of the holes and are frictionally retained therein with spring-loaded terminals of the units electrically contacting the keyed contacts on the printed circuit card. A further array of keyed contacts at the opposite edge of the card is adapted to mate with a female connector when the card is inserted into position in a card shelf, the handle being exposed with legends and indicator units visible thereon and with control units accessible for selective exercise of control on the operation of the circuit carried by the card.

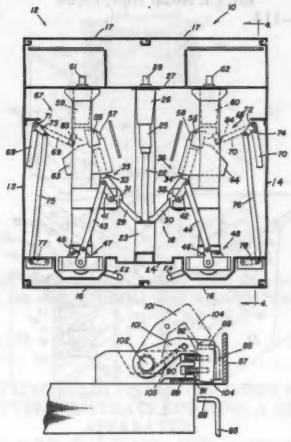
3,573,559

INTERLOCKING FUSE AND SWITCH SYSTEM FOR DISTRIBUTION OF ELECTRIC POWER

Edward J. Rogers, Chicago, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Sept. 18, 1969, Ser. No. 859,109
Int. Cl. H02b 1/18, 11/14
U.S. Cl. 317—114 18 Claims

For distribution of electric power metal enclosed drawer-mounted fuses are provided having manually operated switches commonly connecting them to a loop feeder circuit. Manually operated grounding switches connect the switch contacts to ground. Interlocks prevent opening of the fuse drawer when the loop feeder switches are closed, closure of



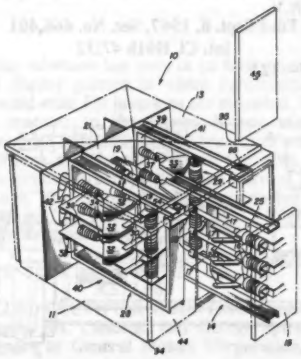
the loop feeder switches when the fuse drawer is open, grounding of the switch contacts when the loop feeder switches are closed, and closure of the loop feeder switches when the switch contacts are grounded.

3,573,560

INTERLOCK SYSTEM FOR METAL ENCLOSED SWITCHGEAR HAVING A FUSE DRAWER AND SLIDING PANELS

Edward J. Rogers, Chicago, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Sept. 18, 1969, Ser. No. 858,939
Int. Cl. H02b 1/04; H01h 9/20
U.S. Cl. 317—114 16 Claims



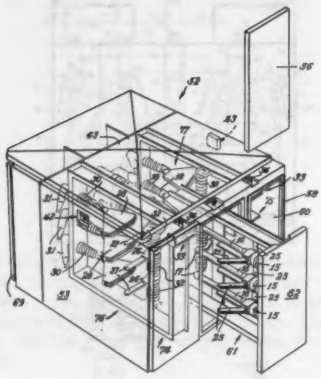
A metallic housing encloses high voltage switchgear including a horizontally slidable fuse drawer having a switch pivoted on each side with vertically slidable access panels for the switches. An interlocking system prevents: opening of the fuse drawer and removal of the sliding panels unless both switches are open, closure of either of the switches with the fuse drawer open and replacing the panels in their fully closed positions after the fuse drawer is closed.

3,573,561

ENCLOSURE FOR PAD MOUNTED ELECTRICAL SWITCHGEAR HAVING SLIDING TOP AND END PANELS

Emmett R. Beebe, Glenview, Ill., assignor to S & C Electric Company, Chicago, Ill.

Filed Sept. 16, 1969, Ser. No. 858,458
Int. Cl. H02b *1/04, 13/06*
U.S. Cl. 317—114 13 Claims



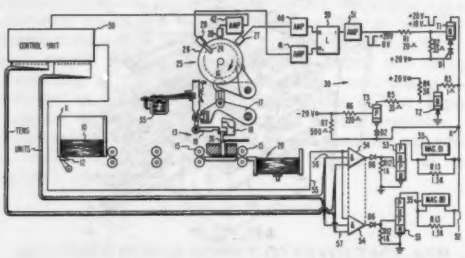
Metallic housing for pad-mounted high voltage switches and fuses has sliding top panel which must be shifted forward or back to permit removal of back and front sliding access panels. A lock prevents movement of the top panel from overlying relation to the front and rear panels. Fuses are mounted in a drawer which is locked closed and can only be opened when the lock under the top panel is uncovered. Access to the manual operator for the switch assembly or assemblies is accessible only when the top panel is shifted back. A mechanical maze construction between exposed movable panels reduces likelihood of entrance of wire and the like.

3,573,562

MAGNET DRIVER CIRCUIT

Charles C. Hanson, and Blayne E. Maring, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sept. 8, 1967, Ser. No. 666,401
Int. Cl. H01h *47/32*
U.S. Cl. 317—123 4 Claims



An emitter controls the setting and resetting of a latch. The amplified set output of the latch turns on a current switch. The current switch conditions the anodes of silicon controlled rectifiers. The silicon controlled rectifiers are selectively turned on through logic circuitry. The magnets are connected in the anode circuit of the silicon controlled rectifiers.

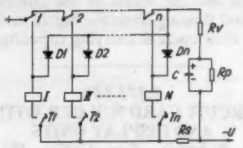
The magnets are deenergized by tuning the silicon controlled rectifiers off. This is done by reverse biasing the silicon controlled rectifiers, anode to cathode, by turning the current switch off. When the current switch is turned OFF, current continues to flow through the silicon controlled rectifiers for a short time. A back e.m.f. is generated when the current in the magnet coil is decreasing. This back e.m.f. is used to turn on a transistor referenced to a particular negative potential. This transistor then provides base current for another transistor which provides a path for collapsing the fields of the magnet coils.

3,573,563

LOCKOUT CIRCUIT INCORPORATING ELECTROMAGNETIC RELAYS

Gunter Hovorka, Wien, Austria, assignor to International Standard Electric Corporation, New York, N.Y.

Filed July 1, 1968, Ser. No. 741,651
Claims priority, application Austria, July 28, 1967, A7,015/67
Int. Cl. H01h *47/00*
U.S. Cl. 317—136 4 Claims



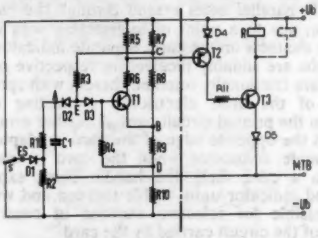
A lockout circuit is provided to prevent the operation of all but one of a plurality of interconnected reed relays. Each relay includes a two-way contact and a winding. A common resistance-capacitance circuit is employed to provide a potential to the relay winding to keep it energized during the time which elapses between the opening of a normally closed contact and the closing of a normally open contact.

3,573,564

RELAY TIME CONTROL CIRCUIT

Hans Blauert, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed May 13, 1968, Ser. No. 728,600
Claims priority, application Germany, May 23, 1967, S 109977
Int. Cl. H01h *47/18, 47/32*
U.S. Cl. 317—142 8 Claims



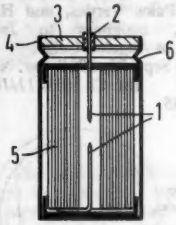
A relay time control circuit that varies the inherent response and dropout times of the relay and maintains the actual response and dropout times to a defined range. An electronic switch is controlled by an RC time control circuit to initiate relay actuation when predetermined voltage conditions exist within the RC circuit. The electronic switch is decoupled from the time control circuit, and therefore temperature sensitivity of the electronic switch is not affected by the latter.

3,573,565

FLUID SEALED HOUSING FOR AN ELECTRICAL COMPONENT

Alfred Grunert, and Glass Werner, Heidenheim-Brenz, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed July 16, 1969, Ser. No. 889,018
Claims priority, application Germany, July 16, 1968, G 67 53 244
Int. Cl. H01g *1/02*; H01q *9/08*
U.S. Cl. 317—230 2 Claims



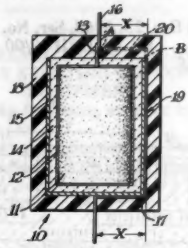
A regenerable electrical condenser is disposed in a can-type housing having a lid tightly sealed thereto to prevent leakage. The condenser includes a mechanically operable fuse therein secured to the can and to the lid, and the can has corrugations for expansion upon a buildup of gas to cause separation of the fuse element. The lid is welded to the can to maintain a liquid-tight seal both before and after operation of the fuse.

3,573,566

SOLID ELECTROLYTE CAPACITOR WITH AXIAL LEADS AND METHOD OF ATTACHING THE SAME

Lawrence E. Fournier, Kennebunkport, and Robert S. Shuris, Kennebunk, Maine, assignors to Sprague Electric Company, N. Adams, Mass.

Filed Apr. 8, 1969, Ser. No. 814,374
Int. Cl. H01g *9/05*
U.S. Cl. 317—230 4 Claims



A solid electrolyte capacitor is provided with axially aligned cathode and anode lead wires, with the cathode lead in electrical contact over a substantial portion of the cathode surface. The leads are attached by inserting a capacitor section into a wireform at a point along its length having a preshaped angular configuration designed to generally conform to portions of an end and side surface of the capacitor section. The wireform is connected to both the anode riser and substantial portions of the cathode coating and then severed at nonconforming locations so as to electrically isolate the ends of the wireform.

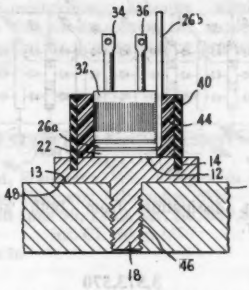
3,573,567

SOLID-STATE SWITCH HOUSING

Robert L. Harris, North Scituate, and Joseph P. Stefani, Warwick, R.I., assignors to General Electric Company

Filed Apr. 8, 1969, Ser. No. 814,246
Int. Cl. H01l *1/06*
U.S. Cl. 317—234 1 Claim

The present invention relates to a solid-state switch housing and heat sink. More particularly it provides a heat sink which is readily mountable to a larger heat sink and in an insulating enclosure which provides a relatively long



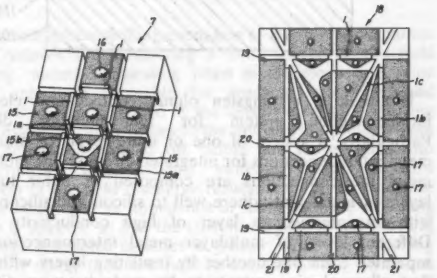
electrical path between the switch and the heat sink as compared to the heat transfer path from the switch to the heat sink.

3,573,568

LIGHT EMITTING SEMICONDUCTOR CHIPS MOUNTED IN A SLOTTED SUBSTRATE FORMING A DISPLAY APPARATUS

Harvey V. Siegel, Mayfield Heights, Ohio, assignor to General Electric Company

Filed June 18, 1969, Ser. No. 834,338
Int. Cl. H01l *15/00*
U.S. Cl. 317—234 4 Claims



An insulating substrate has slots in its face corresponding to the visual display pattern in which light-emitting chips consisting of solid-state PN junctions are mounted. The chips have ohmic contacts to the P and N-type material on opposite sides which are connected by brazing or soldering to metallized portions on opposite sides of the slots. External electrical connections are made through current feed pins passing through the substrate and connected to the metallized portions. The chips emit edgewise a bright pattern easily visible under room illumination levels.

3,573,569

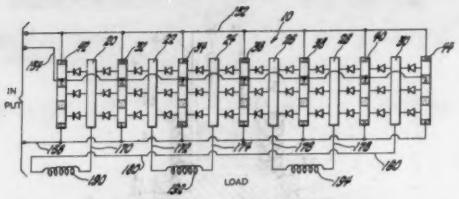
CONTROLLED RECTIFIER MOUNTING ASSEMBLY

Roland O. Davis, Mt. Clemens, and George Spira, Goleta, Calif., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 12, 1969, Ser. No. 849,368
Int. Cl. H01l *1/12*, *1/14*
U.S. Cl. 317—234 6 Claims

A mounting assembly for power semiconductor devices forming a power supply circuit includes a first series of solid conductor mounting plates and a second series of insulated mounting plates for supporting pressure contact-type semiconductors in thermal and electrical conducting relationships. Pressure is evenly applied across the

semiconductor devices which are arranged in a plurality of stacks. A cooling arrangement is included in the assembly to



increase heat dissipation from both sides of each semiconductor.

3,573,570

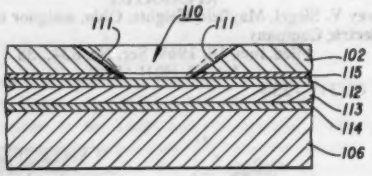
OHMIC CONTACT AND ELECTRICAL INTERCONNECTION SYSTEM FOR ELECTRONIC DEVICES

Clyde R. Fuller, Plano, and James A. Cunningham, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation of application Ser. No. 715,462, Mar. 4, 1968, now abandoned. This application Feb. 26, 1970, Ser. No. 14,767

Int. Cl. H01 *3/00, 5/00*

U.S. Cl. 317—235 **22 Claims**



Disclosed is a tungsten ohmic contact and electrical interconnection system for semiconductor devices. Particularly, a system of one or more levels of multilayer metal interconnections for integrated circuits. The multilayer metal interconnections are composed of outer tungsten layers of metal that adhere well to silicon and silicon oxide with an intermediate layer of high conductivity metal. Different levels of multilayer metal interconnections are separated from one another by insulating layers with holes that allow ohmic contacts to be made between different levels. The final or top multilayer metal interconnections can have one adherent metal layer covered by the high conductive metal layer.

3,573,571

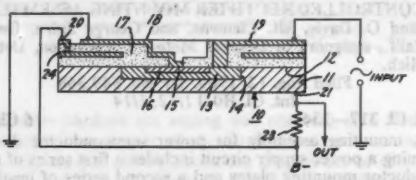
SURFACE-DIFFUSED TRANSISTOR WITH ISOLATED FIELD PLATE

Dale M. Brown, Niskayuna, and William E. Engeler, Scotia, N.Y., assignors to General Electric Company

Continuation-in-part of application Ser. No. 675,226, Oct. 13, 1967, now abandoned. This application May 1, 1968, Ser. No. 725,825

Int. Cl. H01 *11/14*

U.S. Cl. 317—235 **10 Claims**



A surface-diffused transistor exhibiting high stability and low collector capacitance includes a metallic field plate buried within an insulating film which covers the active major wafer surface thereof and passivates a surface-adjacent collector junction. Metal field plate is fixed to a negative potential and prevents inversion of a surface-adjacent region of the P-type semiconductor, thereby preventing surface leakage and increased capacitance.

3,573,572

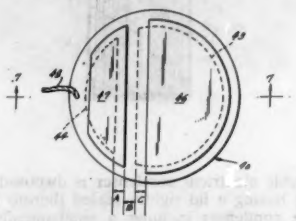
CONTROLLED RECTIFIER HAVING HIGH RATE-OF-RISE-OF-CURRENT CAPABILITY AND LOW FIRING GATE CURRENT

David Cooper, Palos Verdes, and Harold Weinstein, Van Nuys, Calif., assignors to International Rectifier Corporation, Los Angeles, Calif.

Filed Sept. 23, 1968, Ser. No. 761,587

Int. Cl. H01 *11/10*

U.S. Cl. 317—235 **3 Claims**



A semiconductor controlled rectifier having an auxiliary cathode region and a main cathode region with a main control gate lead disposed adjacent to the auxiliary cathode region. The controlled rectifier including the auxiliary cathode region can be fired by a relatively low gate current. The output current of the auxiliary cathode region is connected to auxiliary gates disposed in proximity to the main cathode and supplies necessary current for turning on the main portion of the controlled rectifier.

3,573,573

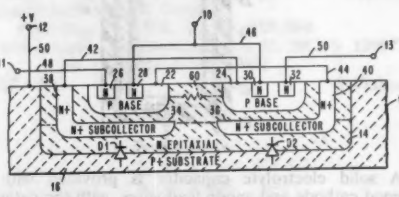
MEMORY CELL WITH BURIED LOAD IMPEDANCES

Richard L. Moore, Poughkeepsie, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 23, 1968, Ser. No. 786,068

Int. Cl. H01 *19/00*

U.S. Cl. 317—235 **5 Claims**



This specification describes semiconductor storage cells for use in monolithic memories. These cells each have two planar transistors formed on a single surface of a monolithic chip. The planar transistors are coupled together to form a bistable circuit and are supplied power from a voltage distribution layer of the chip under the planar transistors so that the load elements for the storage cells are formed vertically through the monolithic chip between the voltage distribution layer and the planar transistors.

3,573,574

CONTROLLED RECTIFIER MOUNTING ASSEMBLY

Roland O. Davis, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

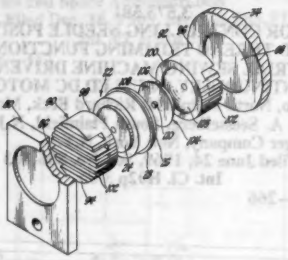
Filed Aug. 12, 1969, Ser. No. 849,367

Int. Cl. H01 *1/12, 1/14*

U.S. Cl. 317—234 **6 Claims**

A mounting assembly for a semiconductor power supply circuit includes a first series and a second series of mounting

supports having heat sink members for attaching opposite ends of pressure contact type semiconductors to the mounting supports. The heat sinks provide cooling of the semiconductors and also include spherical joints for distributing compressive pressures evenly across the ends of



each semiconductor. The semiconductors and mounting supports are assembled in a stacked arrangement which forms integral power supply circuit connections. A cooling system is provided for circulating and cooling a liquid coolant which flows through the heat sinks.

3,573,575

CAPACITOR INPREGNATED WITH CROSSLINKED BUTADIENE HOMOPOLYMER AND METHOD OF MAKING SAME

Thomas G. Brady, Oneonta, and Richard L. Elliott, Sidney, N.Y., assignors to The Bendix Corporation

Filed Dec. 5, 1968, Ser. No. 781,634
Int. Cl. H01g *1/00*
U.S. Cl. 317—258 **10 Claims**

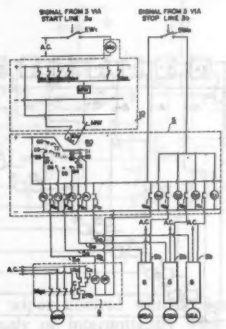
The capacitors of this invention are impregnated with a composition having high dielectric strength, excellent insulation resistance, low dissipation factor, excellent resilience when new and after long storage, and resistance to pulse testing which is very high. Their cost is low. They involve impregnants being a liquid, hydroxyl terminated butadiene homopolymer catalytically cross-linked by diallyl isophthalate or the like. A preferred catalyst combination is revealed. Methods of impregnation are discussed.

3,573,576

AUTOMATIC REMOTE CONTROL SYSTEM FOR SEQUENTIALLY STARTING AIR-CONDITIONING EQUIPMENT

Toshio Nakabo, Osaka-fu, Japan, assignor to Obayashi-Gumi, Ltd., Osaka-shi, Japan

Continuation-in-part of application Ser. No. 412,519, Nov. 19, 1964, now abandoned. This application Sept. 6, 1967, Ser. No. 675,267
Int. Cl. H02p *1/54*
U.S. Cl. 318—102 **6 Claims**



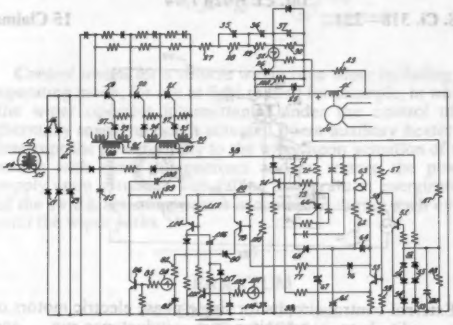
A plugboard having row and column connections is used to program the switch-on and switch-off time of air-conditioning units, arranged in groups; to prevent the sudden surge of starting current upon simultaneous energization of a multiplicity of air-conditioning subunits, a sequence switching device, such as a stepping switch interconnects individual air-conditioning subunits within a group sequentially to the power source; the sequence switching device is controlled by a pulse source providing sequential connecting pulses.

3,573,577

CONTROL SYSTEM FOR BRUSHLESS SYNCHRONOUS MOTOR

Donald R. Boyd, Waukesha, Wis., assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Filed June 30, 1969, Ser. No. 837,808
Int. Cl. H02p *1/50*
U.S. Cl. 318—176 **19 Claims**



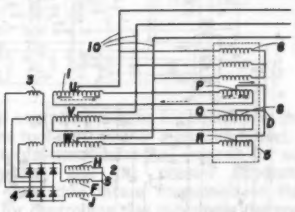
A system for controlling excitation to a synchronous motor has thyristors for connecting a D.C. source to the field winding, means for sensing when motor speed and rotor angle are most favorable for applying excitation, and oscillator means controlled by the sensing means for applying a succession of gating pulses to the thyristors to prevent them from being commutated off before the motor pulls into synchronism. Semiconductor switching means control insertion of the field discharge resistance in circuit with the field winding, and an impedance in shunt with the switching means is selected so that the current through it and the field discharge resistance in series is greater, when the switching means is open, than the hold-in current of the thyristors, thereby assuring that the thyristors are not commutated off before the motor synchronizes.

3,573,578

ELECTRIC MACHINE ARRANGEMENTS INCLUDING ELECTRIC ROTATING MACHINES

Fukuo Shibata, No. 3-22 Tokiwa-cho, Nishinomiya, Japan

Filed June 18, 1969, Ser. No. 834,311
Claims priority, application Japan, June 19, 1968, July 13, 1968, Nov. 18, 1968, 43-50181;43-50180;43-50184
Int. Cl. H02p *7/36*
U.S. Cl. 318—185 **10 Claims**



When terminals in each phase of primary and secondary winding of a transformer are respectively electrically connected with a middle point and both terminals in each

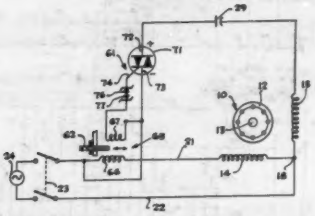
phase of armature stator winding of an electric rotating machine so that electric power can be transferred between the transformer and the rotating machine, two kinds of currents can flow simultaneously in the armature winding, therefore two different numbers of poles can be produced simultaneously in the stator; and the machine can operate as two rotating machines, when the machine has two kinds of rotor windings.

3,573,579

SINGLE-PHASE MOTOR CONTROLS USING UNITARY SIGNAL-CONTROLLED BI-DIRECTIONAL SEMICONDUCTOR GATE DEVICES

Alexander J. Lewus, 9230 N. 14th Ave., Phoenix, Ariz.

Continuation-in-part of application Ser. No. 362,764, Apr. 27, 1964, now abandoned, Continuation-in-part of application Ser. No. 666,269, Sept. 8, 1967, now abandoned.
This application Jan. 21, 1970, Ser. No. 4,562
Int. Cl. H02p *1/44*
U.S. Cl. 318—221 **15 Claims**



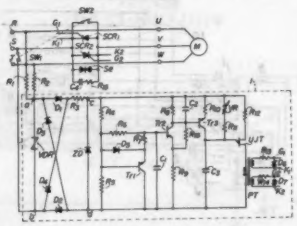
External control circuits for single-phase electric motors of the split-phase, capacitor-start inductance-run, and capacitor-start capacitor-run kinds in which the starting winding is connected to a power supply through a series circuit including a single unitary signal-controlled bidirectional gate device or by a plurality of such devices triggered from a common sensing means. In each circuit, the sensing means is connected in series with the power circuit for the main or running winding of the motor; the sensing means may be an adjustable series resistor or inductance or an air gap sensing transformer having an adjustable magnetic core with the primary winding of the transformer in series in the main winding circuit. The trigger or gate electrode of the gate device, referred to commercially as a triac or a quadrac, is connected to the sensing means to gate the device on for motor currents above a given threshold and to gate the device off for motor currents below a threshold value, the threshold levels being determined by adjustment of the sensing device.

3,573,580

SOFT STARTING DEVICE FOR MOTORS

Nozomu Shinozaki, Neyagawa-shi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Apr. 21, 1969, Ser. No. 817,896
Claims priority, application Japan, Apr. 26, 1968, 43/35281
Int. Cl. H02p *5/40*
U.S. Cl. 318—227 **4 Claims**



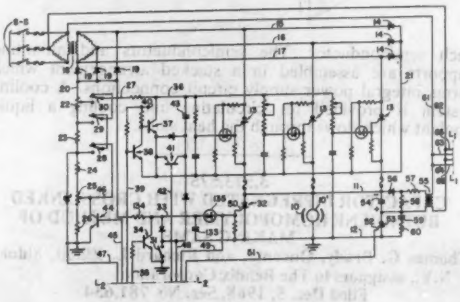
A soft starting device so designed that when a three-phase induction motor is to be started by applying a full line voltage of a power source thereto, the device starts the motor with an extremely low starting torque and thereafter gradually increases the motor speed to cause it to proceed into a steady state rotation.

3,573,581

SYSTEM FOR CONTROLLING NEEDLE POSITIONING DRIVE AND THREAD TRIMMING FUNCTIONS OF AN INDUSTRIAL SEWING MACHINE DRIVEN BY A CONTINUOUSLY COUPLED DC MOTOR

John J. Dutko, North Plainfield; Richard Beck, Morris Plains, and Henry A. Seesselberg, South Plainfield, N.J., assignors to The Singer Company, New York, N.Y.

Filed June 24, 1969, Ser. No. 836,103
Int. Cl. H02p *3/06*
U.S. Cl. 318—266 **10 Claims**



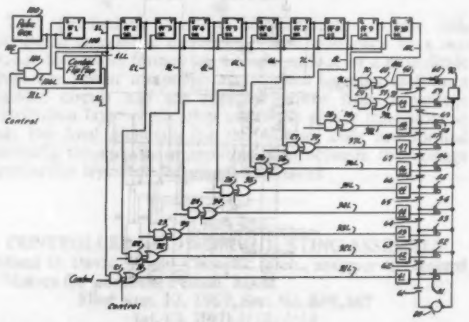
Solid-state digital logic circuitry with gates, memory flip-flops, delay and sensor elements provide a logic system for controlling the drive and braking currents to a DC motor continuously coupled in driving relation to a sewing machine. In response to certain input commands, a series of events are signaled by the logic circuitry to occur automatically in a predetermined time sequence resulting in a desired output sewing related function. Silicon controlled rectifiers (SCR's) are used to supply driving current to the motor from a polyphase voltage supply. A single SCR is used to supply dynamic braking current for the motor. The single SCR is turned off to terminate a first braking period when a solid-state switch operates responsively to a speed sensor to reduce the SCR current below its holding value.

3,573,582

LARGE DC MOTOR CONTROL CIRCUIT

Edward A. Petrocelli, San Diego, Calif.

Filed Mar. 20, 1969, Ser. No. 808,735
Int. Cl. H02p *1/28, 7/14*
U.S. Cl. 318—305 **10 Claims**



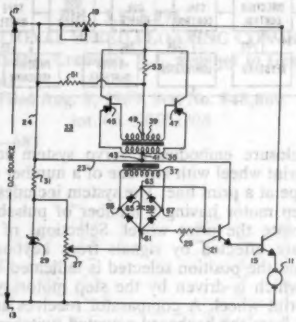
A motor control apparatus for starting, stopping, and regulating the speed of large electric motors.

3,573,583

DC MOTOR SPEED CONTROL SYSTEM

William M. McCampbell, Huntsville, and Hershel M. Nance, Harvest, Ala., assignors to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Dec. 16, 1969, Ser. No. 885,571
Int. Cl. H02p *5/16*
U.S. Cl. 318—317 6 Claims



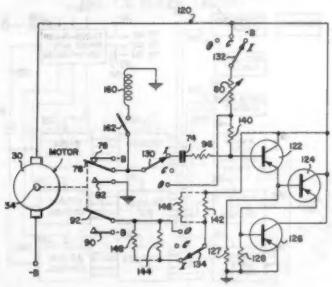
A motor speed control circuit wherein a signal proportional to the IR drop of the armature is utilized to drive a self-excited inverter to obtain a feedback voltage equal to the IR drop of the armature. The feedback voltage is added as a positive feedback to a constant DC voltage to form the input to a unity gain amplifier. The last stage of the amplifier is in series with the armature of the motor. The speed at which the motor operates is controllable by means of varying the value of the constant DC voltage.

3,573,584

MOTOR SPEED CONTROL

Robert W. Kearns, 20524 Rutherford, Detroit, Mich.

Continuation-in-part of application Ser. No. 414,973, Dec. 1, 1964, now abandoned. This application Sept. 1, 1967, Ser. No. 666,549
Int. Cl. H02p *5/10*
U.S. Cl. 318—331 9 Claims



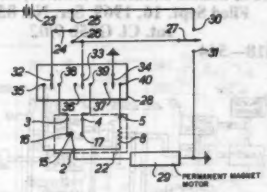
A windshield wiper control which operates the wiper blades continuously or intermittently with a dwell period between each wiping cycles. In the intermittent operation the wiper blades are responsive to the condition of the windshield. Transistors are provided for controlling the intermittent operation and also for controlling the continuous mode of operation.

3,573,585

INTERMITTENT WINDSHIELD WIPER MOTOR CONTROL

John C. Taylor, Otters 'Ole, Market St., Buxton, England

Filed May 5, 1969, Ser. No. 821,813
Claims priority, application Great Britain, May 15, 1968, 23157/68
Int. Cl. B60s *1/08*
U.S. Cl. 318—443 4 Claims



Control means for a vehicle windscreen wiper including an operating mode, for use in light rainfall for example, in which the wiper operates intermittently under the control of a thermally sensitive switch actuated by an auxiliary heater to interrupt the power supply to the wiper upon actuation of the switch with rising temperature and to restore the power supply upon actuation with falling temperature; energization of the switch actuating heater is continued during each cycle until the wiper parks.

ERRATUM

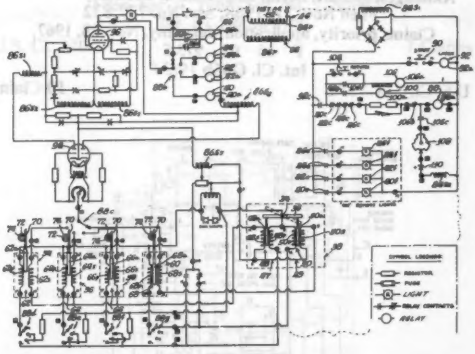
For Class 318—578 see:
Patent No. 3,573,546

3,573,586

SERVO CONTROL FOR MOVEMENT OF A DEVICE THROUGH SUCCESSIVE STEPS

Arthur K. Littwin, 6555 LeMai, Lincolnwood, Ill.

Continuation-in-part of application Ser. No. 455,564, May 13, 1965, now abandoned. This application Nov. 26, 1968, Ser. No. 779,103
Int. Cl. G05b *19/36*
U.S. Cl. 318—579 4 Claims



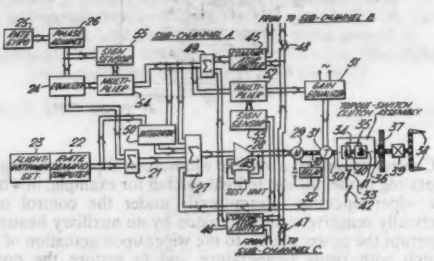
Electrical control apparatus for controlling the movement of a machine tool part, such as a grinding wheel; the machine tool has internal mechanism and controls for advancing the grinding wheel, and the present apparatus includes presettable induction means responsive to the advancing movement for controlling that movement the predetermine a definite maximum range of movement and establish a series of steps within that range; the steps can be of any desired extent independent of the extent of the maximum range, and need not be equal divisions of that range; e.g., if nine one-thousandths inch of material is to be removed from a

workpiece by the grinding wheel, the apparatus may be preset to automatically remove four increments of two one-thousandths inch each and a final increment of one one-thousandths inch.

3,573,587
MULTIPLEX SYSTEMS

Roger I. Bishop, Bishops Cleeve; Terence J. Grimwood, Cheltenham, and John L. Weston, Churchdown, England, assignors to Smiths Industries Limited, London, England

Filed Sept. 16, 1969, Ser. No. 858,296
Int. Cl. G05b *9/02*
U.S. Cl. 318—564 **16 Claims**

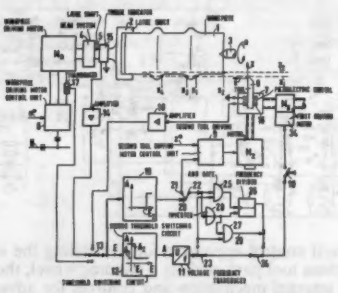


A triplex servocontrol channel of an aircraft flight-control system includes equalization that balances out acceptable inequalities between the three servo subchannels and involves the application degeneratively in each subchannel of two difference signals that are derived therein in accordance respectively with the differences in output as between that subchannel and the other two subchannels. The difference signals are individually limited in magnitude before application degeneratively in the respective subchannel. Each subchannel servomotor is coupled to an output gear common to the three subchannels via a torque-switch that declutches the motor from the gear under excessive torque-loading.

3,573,588
AUTOMATIC FEED CONTROL SYSTEM FOR A MACHINE

Werner Geyer, Nurnberg; Rolf Klinge, Reutles, and Jurgen Meyer, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Nov. 21, 1968, Ser. No. 777,832
Claims priority, application Germany, Nov. 28, 1967, P 16 02 973.5
Int. Cl. G05b *19/24*
U.S. Cl. 318—571 **10 Claims**

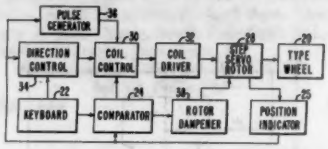


A magnitude which depends upon the forming power of a machine having a machine tool adapted to engage a workpiece is determined. The tool is rapidly driven while it is out of engagement with the workpiece. The drive of the tool is slowed when it engages the workpiece and the magnitude depending upon the forming power of the machine exceeds a lower threshold value.

3,573,589
POSITION SERVO SYSTEM FOR A MOTOR INCLUDING DETENTING AT DESTINATION

Jack Berry, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 1, 1969, Ser. No. 812,006
Int. Cl. G05b *19/28*
U.S. Cl. 318—601 **6 Claims**

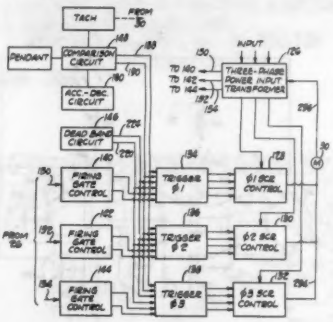


The disclosure embodies a servo system to position a rotatable print wheel with any one of a number of selectable printing type at a print line. The system includes a reversible electric step motor having a number of pulsable induction coils to rotate the print wheel. Selections of print wheel positions are effected by signals from keyboard actuated switches and the position selected is indicated by a position indicator which is driven by the step motor synchronously with the print wheel. A comparator receives and compares the signals from the keyboard actuated switches with signals from the position indicator to determine the angular displacement between the selected position and present position of the print wheel. Through digital logic systems including a pulse generator and a direction selection means, the number of pulses supplied to the motor to position the print wheel is effected along with the rotational driving of the wheel in the direction requiring least angular displacement of the wheel to reach the selected position. During the positioning of the print wheel, a control member responds to a match between the keyboard selected position and the position indicator to dynamically brake the step motor by simultaneously energizing all of the induction coils.

3,573,590
HORIZONTAL BORING MACHINE

John F. Reed, Middleburg Heights, Ohio, assignor to The New Britain Machine Company, New Britain, Conn.

Continuation-in-part of application Ser. No. 835,441, June 23, 1969. This application Dec. 5, 1969, Ser. No. 882,660
Int. Cl. G05b *5/01*
U.S. Cl. 318—618 **5 Claims**



A machine tool including a movable spindlehead member having an extensible and retractable tool spindle member, and a work-supporting compound slide assembly having two slide members movable in directions at right angles to one another. All members can be selectively "inched" and moved at feed and transverse rates in opposite directions along their respective paths of movement by two variable speed motors, one connectable to the spindlehead or the tool spindle and

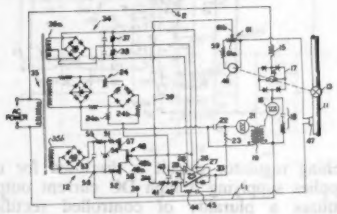
the other to either of the two slide members of the work-supporting compound slide. The motors are connected to their respective tool and work-moving members through discrete transmissions of the continuously meshed gear type under the control of hydraulically-actuated clutches. Spindle feed is alternatively provided from a spindle drive motor to correlate feed with rotation. Brake discs selectively deflectable against fixed abutments and connected to rotatable parts will maintain selected tool and work-carrying members in fixed positions.

3,573,591

PROPORTIONAL SPEED FLOATING CONTROLLER

Quentin C. Turtle, Cranston, R.I., assignor to General Signal Corporation

Filed Aug. 8, 1969, Ser. No. 848,660
Int. Cl. G05f *1/08*
U.S. Cl. 318—681 6 Claims



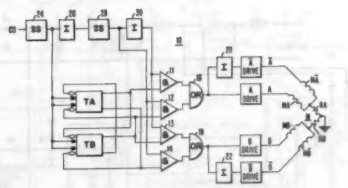
Solid-state proportional speed floating controllers employing an integrating amplifier in the feed-forward path and a tachometer generator for producing a velocity feedback signal. The final controlling element is positioned by a DC or universal motor which also drives the tachometer and which is supplied with power through a static switch which is gated by a static trigger. The firing angle of the trigger is controlled by an RC timing circuit that receives line synchronized voltage pulses on which is superimposed the output voltage of the amplifier.

3,573,592

SINGLE STEP STEPPING MOTOR CONTROL

Gerald J. Agin, Owego, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 15, 1969, Ser. No. 850,584
Int. Cl. H02p *37/00*
U.S. Cl. 318—696 3 Claims



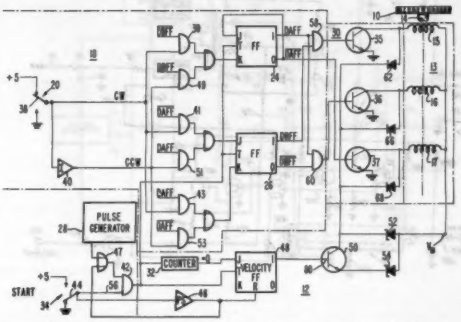
Nonoscillatory single step operation of a stepping motor is obtained by using the usual drive triggers to start the step operation, and using gating circuits therewith to obtain a one step-backward function logically from the trigger outputs and a Stop single shot for terminating the single step operation.

3,573,593

ANGULAR VELOCITY CONTROL SYSTEM FOR STEP SERVO MOTOR SYSTEM RESPONSIVE TO WINDING DEENERGIZATION

Jack Beery, Farmington, Mich., assignor to Burroughs Corporation, Detroit, Mich.

Filed Apr. 1, 1969, Ser. No. 812,005
Int. Cl. G05b *19/40*
U.S. Cl. 318—696 6 Claims



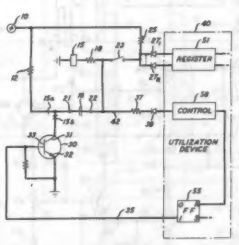
The disclosure embodies an electrical system for a bidirectional step servomotor to control the dissipation of counter torque developed by the deenergization of each rotor coil. The amplitude of the induced voltage generated when each rotor coil is deenergized is electrically controlled by a selected one of a plurality of voltage regulators. Each voltage regulator has a different regulating voltage. The larger the amplitude of the induced voltage, the faster the dissipation time of the counter torque, therefore, the higher the angular velocity of the rotor.

3,573,594

SINGLE PULSE GENERATING CIRCUIT

Daniel Danielsen, Wheaton, Ill., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Apr. 4, 1968, Ser. No. 718,850
Int. Cl. H02m *1/00*
U.S. Cl. 320—1 7 Claims

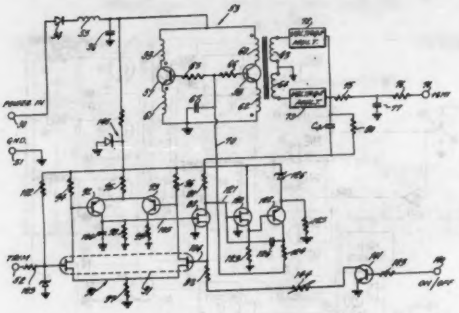


A circuit uses a capacitor store to generate a single pulse in response to the closing of a switch. A first terminal of the capacitor is normally connected to a charging source. The closing of the switch transfers the first terminal from the charging source to a discharge path after a predetermined time delay. The discharge path is completed in response to a control signal so that the capacitor is discharged and a single pulse appears at the second terminal of the capacitor.

3,573,595
CONSTANT CURRENT FEEDBACK REGULATOR WITH ADJUSTABLE IMPEDANCE FOR MAINTAINING CONSTANT CURRENT

Filippo B. Galluppi, Mt. Vernon, N.Y., assignor to Venus Scientific Inc., Farmingdale, N.Y.

Filed May 28, 1969, Ser. No. 828,567
Int. Cl. H02p 13/22; H02m 3/22; H03k 3/281
U.S. Cl. 321—2 7 Claims

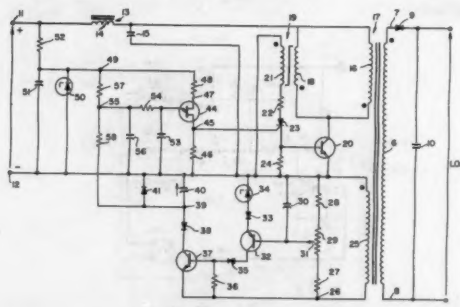


A high-voltage power supply has a controlled output oscillator operated from a low-voltage DC source. The output voltage of the oscillator is increased by a voltage multiplier. A series circuit comprising a high ohmic resistor, a transistor device and an adjustable low ohmic resistor is connected in parallel with the oscillator output, and the transistor impedance is varied to maintain a constant current in the parallel path. The voltage developed at the transistor for maintaining a constant current is then used to control the oscillator in order to maintain constant output voltage.

3,573,596
ELECTRONIC CONVERTER FOR USE IN THE VOLTAGE TRANSFORMATION AND REGULATION OF A UNI-DIRECTIONAL VOLTAGE

Zvi Kamil, Haifa, and Reuven Kaplan, Kiriat Haim, Israel, assignors to State of Israel, Ministry of Defence, Hakiriya, Tel Aviv, Israel

Filed June 19, 1969, Ser. No. 834,747
Int. Cl. H02m 3/22
U.S. Cl. 321—2 10 Claims

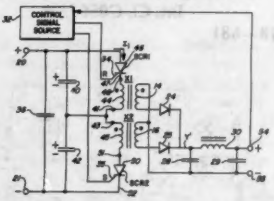


An electronic converter for use in the voltage transformation and regulation of a unidirectional voltage having a controlled relaxation oscillator to which is coupled a power monostable circuit so as to be triggered thereby, an energy storage and voltage transformation transformer being coupled to the monostable circuit, the transformer having an output winding coupled to a load and a sensing winding tightly coupled to the output winding so as to sense the output voltage level. The sensing winding has coupled thereto a threshold detector which serves to transmit the excess energy stored in the transformer to a storage and filtering capacitor coupled to the detector via an amplifier which serves to switch the excess energy to the storage and filtering capacitor which is coupled to the relaxation oscillator so as to control its frequency and thereby maintain the output voltage at the required level.

3,573,597
HIGH CURRENT SWITCHING REGULATOR WITH OVERLAPPED OUTPUT CURRENT PULSES

Luther L. Genuit, Scottsdale, and John R. Nowell, Phoenix, Ariz., assignors to General Electric Company

Filed Dec. 29, 1969, Ser. No. 888,273
Int. Cl. H02m 3/22
U.S. Cl. 321—2 11 Claims

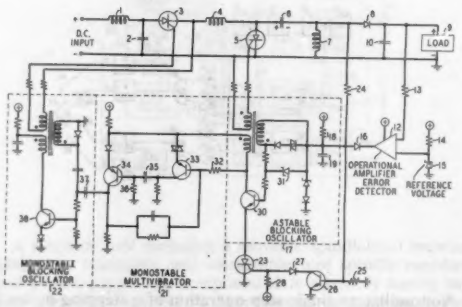


A switching regulator circuit is disclosed for use with power supplies supplying a high DC current output. The circuit utilizes a plurality of controlled rectifiers and inductive reactors with sequential gating of the rectifiers at regular intervals for providing overlapped output current pulses from the reactors thereby delivering high output currents with relatively low RMS ripple currents in input and output filter capacitors, as well as relatively lower RMS current through the controlled rectifiers. The reduced RMS value of ripple currents permits the use of input and output filter capacitors and controlled rectifiers having lower ripple current ratings thereby improving the electrical efficiency by reducing resistive losses in the filter capacitors and facilitating a reduction in size and volume for power supplies having a given current rating.

3,573,598
OVERLOAD PROTECTED SWITCHING REGULATOR-CONVERTER

Patrick W. Clarke, Murray Hill, N.J., and Rudolph Scuderi, New York, N.Y., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 16, 1969, Ser. No. 825,195
Int. Cl. H02m 3/32; H02h 7/14; G05f 1/08
U.S. Cl. 321—2 8 Claims



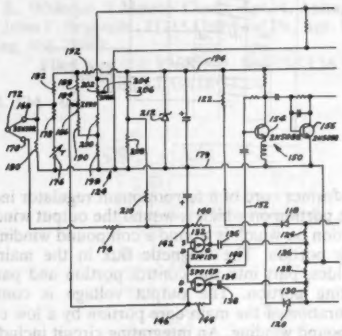
A regulated converter wherein a current limiting inhibit circuit connected across the output inductor disables the switching control network until the energy stored in the

output inductor, as indicated by the polarity of the potential across the inductor, is dissipated. Overload protection is thus simply provided and RF voltage spikes are eliminated.

3,573,599
TWO-WIRE CURRENT TRANSMITTER WITH TRANSFORMER ISOLATION

Robert C. Rose, Mineapolis, Minn., assignor to Rosemount Engineering Company, Eden Prairie, Minn.

Filed Oct. 27, 1969, Ser. No. 869,671
Int. Cl. H02m *3/28*
U.S. Cl. 321—2 **25 Claims**

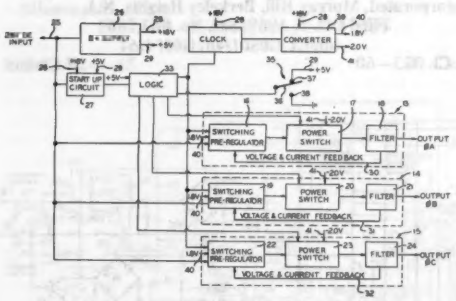


A transmitter controls the flow of DC load current through two wires in accordance with the magnitude of a DC voltage representative of a variable condition. Transformer coupling is used to isolate the load side from the sensing side. This permits a thermocouple to be employed, where the variable condition is temperature, and to be freely grounded without adversely affecting the output or load current. Special DC/AC and AC/DC circuitry is included.

3,573,600
COMBINATION THREE PHASE-ONE PHASE INVERTER

Thomas E. Carlisle, Addison, Ill., assignor to Vapor Corporation, Chicago, Ill.

Filed Aug. 8, 1969, Ser. No. 848,458
Int. Cl. H02m *5/14*
U.S. Cl. 321—7 **3 Claims**

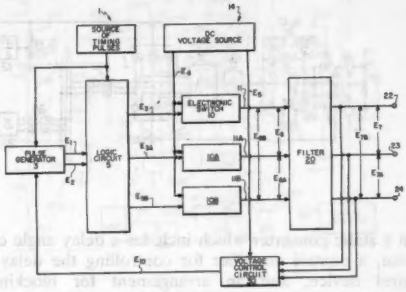


An inverter having drive change means for converting three phase operation to single phase operation where single phase power is supplied at the same rating as the rating for three phase power. A controlled drive means in a solid state static inverter for the power outputs supplies the outputs 120° out of phase for three phase operation or in phase for single phase operation.

3,573,601
TRANSFORMERLESS PULSE WIDTH MODULATED INVERTER FOR PROVIDING THREE PHASE VOLTAGE FOR A THREE WIRE LOAD

Albert H. Esser, Clifton, N.J., assignor to The Bendix Corporation

Filed Mar. 7, 1969, Ser. No. 805,308
Int. Cl. H02m *1/12, 7/52*
U.S. Cl. 321—9 **8 Claims**

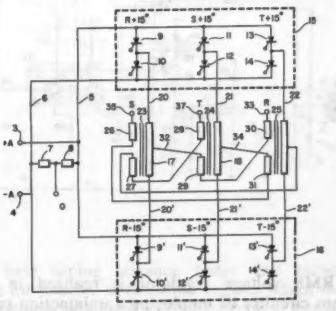


A direct current to three phase inverter in which each 90° segment of a sinusoidal voltage is divided into three 30° sections and only two pulse widths are required to approximate the area of the sinusoidal voltage. One pulse width is used during one 30° section, the second pulse width is used during another 30° section and the difference between the two pulse widths is used during a third 30° section. The two pulse widths are chosen so that the area under the pulses approximates the area under each 30° section of the sinusoidal voltage.

3,573,602
THREE-PHASE INVERTER

Arne Jensen, Nordborg, Denmark, assignor to Danfoss A/S, Nordborg, Denmark

Filed June 16, 1969, Ser. No. 833,475
Claims priority, application Germany, June 19, 1968, P 17 63 530.2
Int. Cl. H02m *1/12*
U.S. Cl. 321—9 **13 Claims**

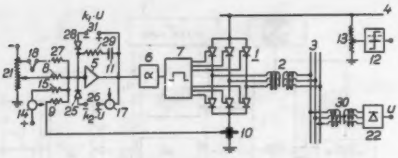


The invention relates to a three-phase inverter producing a stepped voltage between each two output terminals which approximates the sinusoidal form. The apparatus includes two three-phase inverter systems of the type comprising pairs of parallel arranged controllable rectifiers and three transformers each having a primary winding and two secondary windings.

3,573,603
DEVICE IN CURRENT CONVERTERS

Jerker Andersson, Ludvika, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Aug. 4, 1969, Ser. No. 847,013
Claims priority, application Sweden, Aug. 29, 1968, 11600/68
Int. Cl. H02m *1/18*
U.S. Cl. 321—12 4 Claims

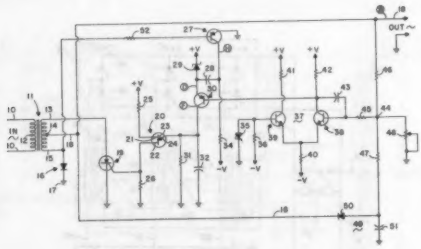


In a static converter which includes a delay angle control device, a control amplifier for controlling the delay angle control device, and an arrangement for blocking the converter. In order to provide for rapid starting of the converter a limiting member for limiting the delay angle of the converter so as to limit the direct voltage of the converter is controlled by the output signal of the blocking device over a switch delaying circuit. A transient order device is also connected to the input side of the control amplifier to increase the input signal of the amplifier and the transient order device is actuated by the blocking means for the DC transmission line connected to the converter. An undervoltage sensitive device actuated by the voltage in an AC network connected to the converter is connected in parallel to the blocking device, and the two parallel devices are connected to the limiting member and the transient order device by an OR gate.

3,573,604
RMS AC VOLTAGE REGULATOR

Michael W. Lundgreen, Cedar Rapids, Iowa, assignor to Collins Radio Company, Cedar Rapids, Iowa

Filed Jan. 5, 1970, Ser. No. 515
Int. Cl. H02m *1/08*, H02m *7/20*; H02p *13/26*
U.S. Cl. 321—18 11 Claims

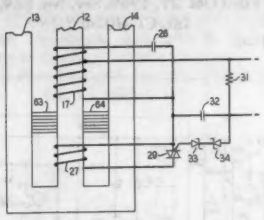


An RMS voltage regulator is realized in a minimal hardware circuitry by employing a unijunction switch to fire a silicon controlled rectifier element, the latter serving to convert a half-wave rectification of AC line voltage to a full-wave operation at intervals defined by RMS variation of the output from nominal. Peak and average values of the output are sensed, combined in ratio, and compared with a reference DC voltage to control the periodicy of SCR firing in a manner to cause average and peak output values to move oppositely, thus attaining a substantially constant output RMS value.

3,573,605
CLOSED LOOP FERRORESONANT REGULATOR

Harry P. Hart, Whippany, and Robert J. Kakalec, Madison, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Continuation-in-part of application Ser. No. 763,882, Sept. 30, 1968, now abandoned. This application Sept. 8, 1969, Ser. No. 856,121
Int. Cl. G05f *1/46*, *1/64*
U.S. Cl. 323—56 14 Claims

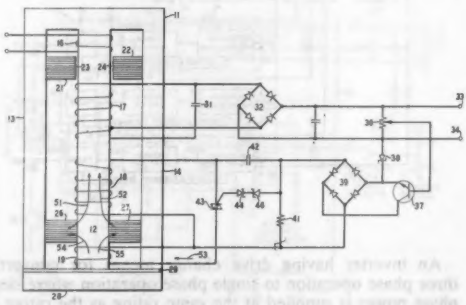


The transformer core of a ferroresonant regulator includes a main core portion on which is wound the output winding, a control portion on which is wound a compound winding, and a saturating portion. The magnetic flux in the main core portion divides, part into the control portion and part into the saturating portion. The output voltage is controlled without saturation of the main core portion by a low current in the compound winding. An integrating circuit including an integrating capacitor is coupled to the output winding to develop a voltage proportional to the volt-time integral of the output voltage. A switch responsive to the integrating capacitor voltage causes current to flow in the compound winding. The current through the compound winding opposes saturation of the control core portion and precipitates saturation of the saturating core portion to limit the total flux swing in the main core portion and the half cyclic average of output voltage. The operation of the switch in conjunction with the saturation of the saturating core portion causes the ferrocapacitor to reverse its charge each half cycle, and ferroresonant regulation is maintained. The output voltage may be varied by varying the rate of charge of the integrating capacitor, and closed loop regulation may be achieved by adding a feedback network responsive to the load voltage for varying the charging rate.

3,573,606
CLOSED-LOOP FERRORESONANT VOLTAGE REGULATOR WHICH SIMULATES CORE SATURATION

Harry P. Hart, Whippany, and Robert J. Kakalec, Madison, N.J., assignors to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Oct. 1, 1969, Ser. No. 862,786
Int. Cl. G05f *1/46*, G05f *1/64*
U.S. Cl. 323—60 7 Claims



In a ferroresonant voltage regulator of the type in which transformer core saturation is simulated by the switching of a separate inductor effectively across the ferrocapacitor in

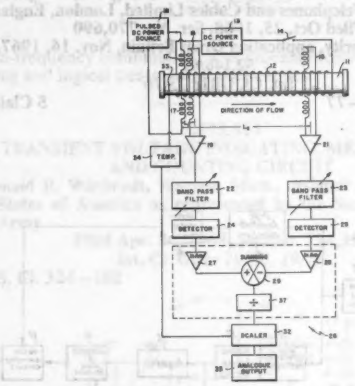
response to the volt-time integral of output voltage, the separate inductor is incorporated into the main transformer as an "inductance" winding on the output or center leg of three core legs. Unwanted magnetic coupling between the inductance winding and the output winding is substantially eliminated by a magnetic shunt between the windings, and the inductance winding is wound in a direction to minimize the flux in the shunt. The inductance is optimized by the choice of thickness of a nonmagnetic spacer between the transformer core endpiece and the legs.

3,573,607

PROTON RESONANCE VOLUMETRIC FLOWMETER

Henry K. Whitesel, 7 Melrob Court, Apt. 4, Annapolis, 21403 and John F. Scarzello, 11215 Oak Leaf Dr. Apt. 1714, Silver Spring, Md. 20901

Filed Aug. 29, 1968, Ser. No. 756,136
Int. Cl. G01n *27/00*
U.S. Cl. 324—0.5 **10 Claims**



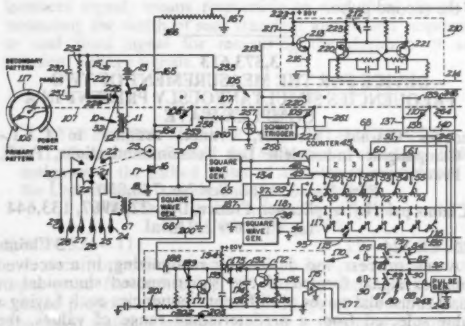
A flowmeter employing proton resonance for determining the rate of flow of a fluid through a pipe of nonmagnetic material. The relaxation of the perturbed magnetic moment is detected inductively by two pickup coils and the resulting signals are processed and combined electronically to give the desired measurement.

3,573,608

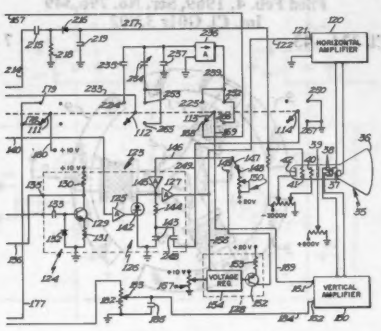
ENGINE ANALYZING APPARATUS WITH CATHODE RAY DISPLAY

Joseph A. Marino, Hopkins, and Richard S. MacCrea, New Brighton, Minn., assignors to Marquette Corporation, Minneapolis, Minn.

Filed Oct. 15, 1968, Ser. No. 767,795
Int. Cl. G01m *15/00*
U.S. Cl. 324—15 **11 Claims**



Engine analyzing apparatus for an internal combustion engine in which a signal indicative of a condition of the ignition system is superimposed upon a horizontal trace of a cathode ray and in which the horizontal trace is initiated at the time the distributor points close rather than when they open. There may be a plurality of horizontal traces, one for each cylinder, arranged to give a "raster" display or the



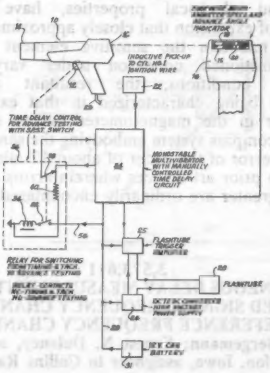
conditions associated with the various cylinders may be displayed in sequence in a "parade" display. Provision is made for displaying the condition of each cylinder by itself or displaying the conditions of any combination of cylinders either individually or in superimposed fashion.

3,573,609

DISTRIBUTOR ADVANCE TESTER WITH TACHOMETER

John L. Vaher, Chicago, Ill., assignor to American Gage & Machine Company, Chicago, Ill.

Filed Feb. 27, 1969, Ser. No. 802,815
Int. Cl. F02p *17/00*
U.S. Cl. 324—17 **4 Claims**


INDUCTIVE PICK-UP TO CYL. NO. 1 IGNITION WIRE
TIME DELAY CONTROL FOR ADVANCE TESTING WITH DIST. SWITCH
MONOSTABLE MULTIVIBRATOR WITH MANUALLY CONTROLLED TIME DELAY CIRCUIT
FLASHTUBE TRIGGER CIRCUITS
FLASHTUBE
DC TO DC CONVERTER HIGH VOLTAGE POWER SUPPLY
12 V. CAR BATTERY

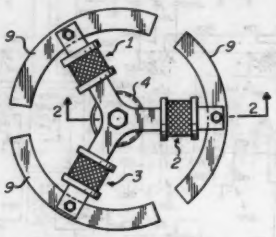
A hand held timing advance tester and tachometer construction for internal combustion engines which includes a source of stroboscopic light and an instrument displaying a first scale for measuring engine speed and a second scale for measuring engine advance. Each time the selected cylinder fires, a flash tube is energized. A time delay circuit will either trigger the flash tube energizing circuit immediately in response to each high voltage pulse applied at the input or will trigger it after a time delay, which is continuously and selectively variable by means of a manual control. The time delay circuit also applies a signal to the indicator, which provides a visual indication of the amount of delay provided by the time delay circuit.

3,573,610

EARTH'S FIELD-SENSITIVE MAGNETOMETER FOR USE IN COMPASS SYSTEMS HAVING GRADUALLY CONVERGING FLUX COLLECTORS AND BEING INSENSITIVE TO VARYING AMBIENT TEMPERATURE

Donald J. Kesselring, Phoenix, Ariz., assignor to Sperry Rand Corporation

Filed Feb. 4, 1969, Ser. No. 796,349
Int. Cl. G01r 33/02
U.S. Cl. 324—43 7 Claims



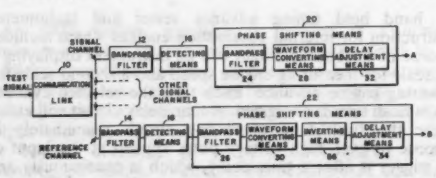
A magnetometer for sensing the horizontal component of the Earth's magnetic field in which the upper and lower radial leg inductors or core members of permeable magnetic material and the upper and lower arcuate collectors of permeable magnetic material associated with the outer peripheral ends of the legs are of substantially equal and uniform cross-sectional areas, the upper and lower collectors being arranged to contact the underside and upper side respectively of the leg inductors and to gradually and uniformly converge toward each other, contacting each other at their free ends; and the base member for supporting the sensitive element, which comprises the permeable core members and associated coils, and to which the sensitive element is securely and firmly fastened in precise position is constructed of a nonmagnetic, electrically insulating material, while the securing devices for holding the sensitive element and base together and for securing the collectors in predetermined position, the core members, and the base, are all formed of such materials that, while having the requisite physical and electrical properties, have temperature coefficients of expansion that closely approximate each other to thereby maintain the sensitive element in its initial precisely positioned condition under varying ambient temperature conditions, the resultant magnetometer arrangement being characterized in that extremely small errors occur in the magnetometer output such that the output of a compass system embodying the same will contain a maximum error of the order of about 12 minutes of arc as compared to prior art devices wherein errors of 38 minutes of arc and greater are ordinarily encountered under similar conditions.

3,573,611

SIMULTANEOUS DELAY MEASUREMENT BETWEEN SELECTED SIGNAL FREQUENCY CHANNELS AND REFERENCE FREQUENCY CHANNEL

Gerald T. Bergemann; Ernest N. Dulaney, and Robert H. Pool, Marion, Iowa, assignors to Collins Radio Company, Dallas, Tex.

Filed Jan. 23, 1969, Ser. No. 793,529
Int. Cl. G01r 27/00
U.S. Cl. 324—57 24 Claims



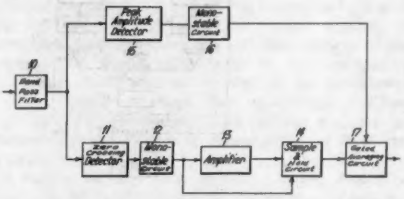
The present invention relates to means for simultaneously measuring differential envelope delay between selected signal frequency channels and a reference frequency channel during transmission through a communications link. A test signal is applied to a bank of band-pass filters which separate the test signal into a reference frequency channel and a plurality of signal frequency channels. The signals of each channel are demodulated and passed to a phase shifting means which is adjustable to establish zero differential delay between the respective signal channel and the reference channel. Thereafter, the test signal is transmitted through the communications link and the output of the communications link is applied to the filter bank. A plurality of delay detecting means each measure differential delay between a respective signal channel and the reference channel and provide a delay signal to suitable indicating means.

3,573,612

APPARATUS FOR ANALYZING COMPLEX WAVEFORMS CONTAINING PITCH SYNCHRONOUS INFORMATION

Robert Walter Alister Scarr, Stansted, England, assignor to Standard Telephones and Cables Limited, London, England

Filed Oct. 25, 1968, Ser. No. 770,690
Claims priority, application Great Britain, Nov. 16, 1967, 52,146/67
Int. Cl. G01r 23/16
U.S. Cl. 324—77 5 Claims



A complex waveform containing pitch synchronous information is applied in parallel to a peak detector and a zero crossing detector. A first monostable is activated by the output signal of the zero crossing detector to provide a first pulse of fixed duration. A sawtooth waveform is activated by the trailing edge of the first pulse. The sawtooth waveform will have an amplitude linearly proportional to time. The leading edge of the next sawtooth waveform will activate a sample and hold circuit to sample and store the sawtooth waveform. A second monostable is activated by the output signal of the peak detector to provide a second pulse of a duration less than the fixed duration. The second pulse switches on (gates) an averaging circuit which is coupled to average the output signal of the sample and hold circuit for the duration of the second pulse. This results in an output signal which is an average of the times between successive zero crossings of the complex waveform within the duration of the second pulse.

3,573,613

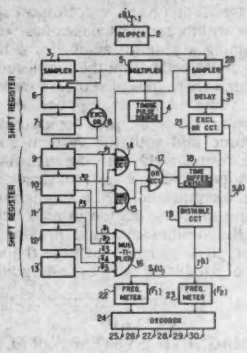
DEVICE FOR THE MEASUREMENT OF TWO FREQUENCIES SIMULTANEOUSLY PRESENT IN A COMPLEX WAVE

Jacques Oswald, Versaille, France, assignor to C.I.T.-Compangnie Industrielle Des Telecommunications, Paris, France

Filed Dec. 3, 1968, Ser. No. 780,850
Claims priority, application France, Dec. 22, 1967, 133,644
Int. Cl. G01r 23/16
U.S. Cl. 324—77 3 Claims

A new process and devices for recognizing, in a received complex signal formed of two superimposed sinusoidal or quasi-sinusoidal waves of different frequencies each having a value selected from a predetermined range of values, the individual values assumed during a given time period by the said two frequencies, and to display these values in numerical

form on an indicator, and or to direct a signal to one or the other of a number of addresses according to the received

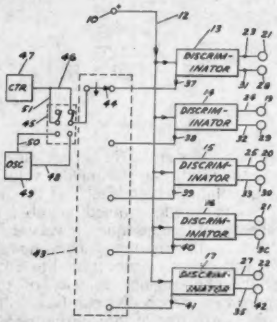


two-frequency combination. The process involves signal sampling and logical treatment of the samples.

3,573,614
TRANSIENT VOLTAGE INDICATING, MEASURING, AND COUNTING CIRCUIT

Donald R. Wittbrodt, Warren, Mich., assignor to the United States of America as represented by the Secretary of the Army

Filed Apr. 26, 1968, Ser. No. 724,350
Int. Cl. G01r *19/00, 19/14*
U.S. Cl. 324—102 **15 Claims**



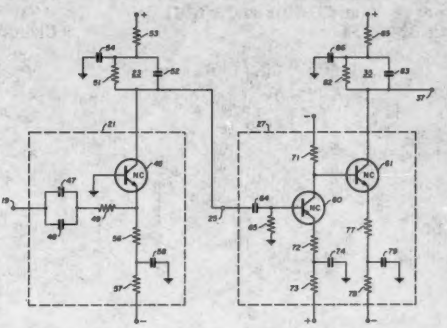
A circuit for indicating, measuring, and counting transient voltage signal characteristics present in a power supply system including means for sensing the transient signal of a predetermined magnitude, control circuit means for generating first, second and third output signals in response to the transient signals, indicator means responsive to said first and second signals for indicating the presence of said transient signal, means responsive to said third signal for measuring the width of said transient and means responsive to said third signal for measuring the duration of said transient voltage signals.

3,573,615
SYSTEM FOR MEASURING A PULSE CHARGE

Dan I. Porat, and Robert L. Anderson, Palo Alto, Calif., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed Sept. 14, 1967, Ser. No. 668,303
Int. Cl. G01r *1/00, 19/00*
U.S. Cl. 324—111 **5 Claims**

A circuit operable in response to a low-power nanosecond input pulse for developing an output pulse having a peak voltage proportional to the total charge of the input pulse. The input pulse is applied through a normally conducting transistor to a storage capacitor, which is discharged through a resistor to drive an amplifier over a decay period on the order of 50 times the period of the input pulse. The amplifier output pulse is applied to a second storage capacitor and discharge resistor circuit to produce an output pulse that has

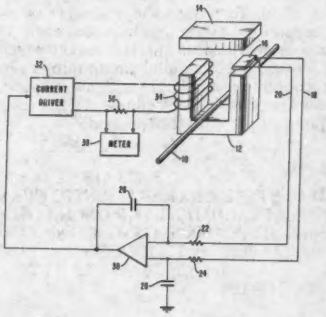


a rise time equal to the input pulse period plus the decay period of the first storage circuit and a fall time equal to the decay period of the second storage circuit.

3,573,616
CURRENT MEASURING SYSTEM HAVING A FEEDBACK PATH INCLUDING A COMBINED HIGH GAIN AMPLIFIER AND INTEGRATOR

Hooshang Kahen, Forest Hills, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 13, 1969, Ser. No. 807,781
Int. Cl. G01r *33/00, 33/06*
U.S. Cl. 324—117 **1 Claim**



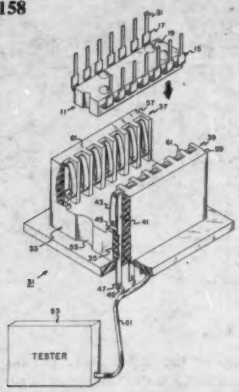
A current-measuring system is provided for measuring over a wide range the flow of direct or alternating current in a conductor. The system includes a magnetic core arranged in two pieces which is clamped around the conductor for producing a magnetic field in response to current flow in the conductor. A magnetic to electric transducer, such as a Hall effect generator, is placed in a gap in the core and the output leads of the Hall effect device is connected to an operational amplifier that integrates the Hall effect signal. The operational amplifier is connected to a current driver, the output of which is connected to windings on the core. The current driver produces an output current in response to the amplifier output signal to oppose the field produced by the core. A resistor is connected between the current driver and the coil and the output voltage across the resistor is a measure of the current in the conductor.

3,573,617

METHOD AND APPARATUS FOR TESTING PACKAGED INTEGRATED CIRCUITS

Ellwood A. Randolph, Winter Garden, Fla., and Paul A. Baump, Reseda, Calif., assignors to AAI Corporation, Cockeysville, Md.

Filed Oct. 27, 1967, Ser. No. 678,560
Int. Cl. G01r *31/22;* **G01b** *7/16*
U.S. Cl. 324—158 **9 Claims**



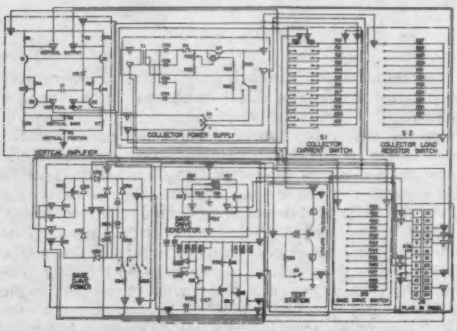
A test apparatus is disclosed for testing a dual in-line packaged integrated circuit having dual rows of leads protruding laterally in respectively opposite directions from the package and bent normal thereto in a common direction. The test apparatus has a test head with dual rows of oppositely paired interfacing spaced contacts which are resiliently laterally inwardly biased towards each other and adapted to be engaged and laterally outwardly displaced from their quiescent position by the leads of the dual in-line packaged integrated circuit inserted between the dual rows of oppositely paired contacts. Each of the contacts is connected to a tester adapted to apply selected signals to selected contacts and sense the result thereof to determine the electrical condition of the integrated circuit inserted on the test head. To protect the dual rows of contacts, a cover with separators extending between each of the adjacent contacts is provided on the test socket which also serves to guide a packaged integrated circuit into engagement with the contacts on the test head. In addition, finger-accommodating recesses are provided to facilitate the insertion of a packaged integrated circuit onto the test head.

3,573,618

SOLID-STATE CHARACTERISTIC CURVE TRACER ATTACHMENT FOR OSCILLOSCOPES

William G. Dilley, 4168 N. 425 West, Ogden, Utah 84404

Filed May 27, 1968, Ser. No. 732,393
Int. Cl. G01r *31/22, 13/20*
U.S. Cl. 324—158 **10 Claims**



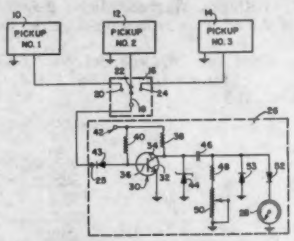
An all solid-state attachment unit for various types of standard oscilloscopes to enable them to perform the functions of a characteristic curve tracer for solid-state devices. The attachment may be modular, constructed as a plug-in unit for certain types of standard oscilloscopes so as to make use of available power, electronic capability, and display contained within such oscilloscopes, or it may be similar but containing a plug-in facility for a power supply auxiliary to those contained within the oscilloscope, so it can be used with certain other types of standard oscilloscopes not providing all the required power supplies, or it may be a completely separate console adapted for plug-in connection with a power source and with the vertical and horizontal amplifier inputs, respectively, of various other types of standard oscilloscopes that are not constructed to receive plug-in units. When connected with a standard oscilloscope, the attachment unit of the invention in effect constitutes an integral part of the oscilloscope and provides augmented capability therefor, so as to make possible the visual display of characteristics of solid-state devices undergoing test.

3,573,619

ELECTROMAGNETIC SYSTEM FOR SCALING FREQUENCIES WHICH ARE PROPORTIONAL TO THE ANGULAR VELOCITIES OF SELECTED ROTATING SHAFTS

Martin Ivec, Joliet, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Feb. 10, 1969, Ser. No. 797,747
Int. Cl. G01p *3/48*
U.S. Cl. 324—174 **5 Claims**



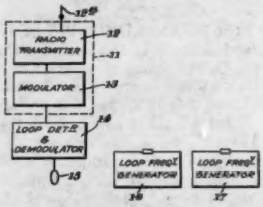
Electromagnetic system for providing a reading proportional to the instantaneous angular velocity of any one of a plurality of rotating shafts. Each of the shafts rotates a disc which has a predetermined number of apertures distributed thereabout to consequently vary the reluctance in a magnetic flux path thereby generating an alternating voltage having a frequency proportional to both the number of apertures and the angular velocity of the shaft. The number of apertures in each disc can be selected to provide frequency scaling. Any one of the alternating voltages can be coupled to an indicating device which develops the reading.

3,573,620

SECURITY SYSTEM WITH INDUCTIVE TO RF COMMUNICATIONS LINKS

John Raymond Ashley, Kyama Frome Road, Radstock, Bath, Somerset, and Colin Grahame Douglas, Stoneybroke Watergates, Colerne, Wiltshire, England

Filed May 31, 1968, Ser. No. 733,693
Claims priority, application Great Britain, May 31, 1967, 25199/67
Int. Cl. H04b *1/50;* **G08b** *25/00*
U.S. Cl. 325—53 **3 Claims**



In a location system a radio transmitter carried by a security guard or watchman includes a loop aerial and a loop

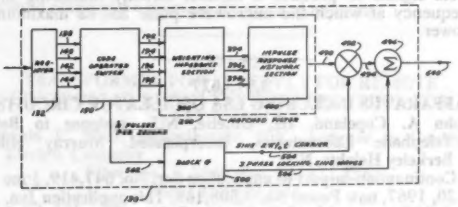
demodulator, and loop carrier frequency generators each generating a loop carrier frequency modulated by a different modulating frequency are installed at different points to be visited by the guard, so that as the guard reaches each point the loop carrier is demodulated and the modulating frequency is used to modulate the transmitter carrier. The transmitted signals are picked up at a distant monitoring point, demodulated, and the modulating frequency is identified with the point visited.

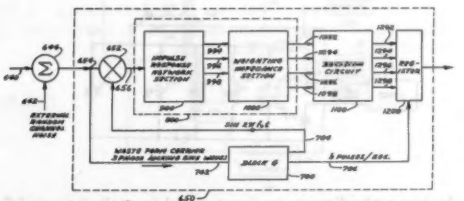
3,573,621

DATA FORMAT CONVERSION AND TRANSMISSION SYSTEM

Meredith S. Ulstad, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Mar. 6, 1967, Ser. No. 621,050
Int. Cl. H04b *1/66*
U.S. Cl. 325—38 5 Claims





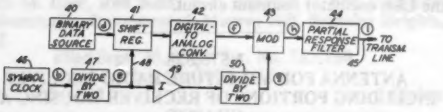
The present invention relates to a data format conversion and transmission system which connects digital information from binary input receiving means in multibit quantities by encoding this information into selected analog waveforms, transmitting the waveforms to a receiver and decoding those analog waveforms in the receiver to reproduce the converted digital information.

3,573,622

PARTIAL-RESPONSE SIGNAL SAMPLING FOR HALF-SPEED DATA TRANSMISSION

Louis N. Holzman, Lincroft, and John R. Sheehan, Red Bank, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Apr. 23, 1968, Ser. No. 723,456
Int. Cl. H04b *1/66*
U.S. Cl. 325—38 5 Claims



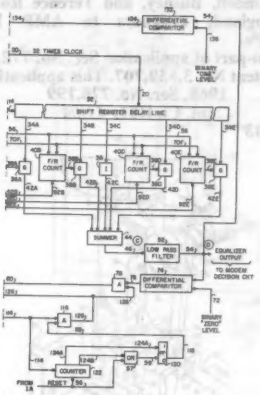
Theoretically maximum equivalent binary data transmission rates are obtainable in partial-response channels; i.e., bandlimited channels with filter shaping which disperses the impulse response to individual data inputs over more than one signaling interval. However, the resultant multilevel line signals occasionally give rise to system start-up problems. These problems are eliminated by initial sampling of alternate data input pairs for one particular partial-response format to produce a two-level line signal which preserves transitions occurring at the basic signaling interval. The same technique provides means for signaling at half the design rate without changing channel filters or the basic clock rate.

3,573,623

TRANSVERSAL FILTER

John Michael Bannon, Baltimore, and Joseph Carroll Kvarda, Silver Spring, Md., assignors to The Bunker-Ramo Corporation, Stamford, Conn.

Filed Oct. 24, 1968, Ser. No. 770,169
Int. Cl. H04b *3/04*
U.S. Cl. 325—42 20 Claims



A transversal filter which includes means for encoding an analogue value of an applied synchronous input signal into a binary pulse train. The binary pulse train is applied through a delay line which has taps spaced at discrete intervals. The outputs from at least selected ones of the taps are utilized to gate predetermined values stored in associated storage means to the inputs of a summing means. The output from the summing means is utilized as the transversal filter output.

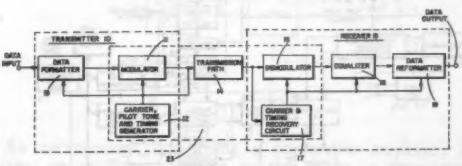
The transversal filter described above may be utilized as part of an automatic line equalizer by initially applying known test signals to the filter and utilizing the error signals generated by comparing the outputs from the filter against a desired reference to adjust the predetermined values stored in the storage means. When these values have been set such as to provide an output which differs from the reference within predetermined limits, the equalizer is ready to operate on information inputs.

3,573,624

IMPULSE RESPONSE CORRECTION SYSTEM

Jon P. Hartmann, Santa Ana, and Gerald N. Yutzi, San Clemente, Calif., assignors to North American Rockwell Corporation

Filed June 24, 1968, Ser. No. 739,555
Int. Cl. H04b *1/10, 1/12*
U.S. Cl. 325—42 14 Claims



A system for determining the impulse response of a transmission channel over which a plurality of consecutive data symbols are transmitted and for compensating the received signals therefor, in which the calculated values of the previously received data symbols modified by the estimated value of the impulse response are subtracted from each signal received over the transmission channel to derive

a corrected signal from which the value of the most recently received data symbol may be calculated. The calculated value of the most recently received data symbol modified by the estimated value of the impulse response is then subtracted from the corrected signal to derive a residual which is a function of the difference between the actual and estimated values of the impulse response. The estimated value of the impulse response is then selectively modified so as to minimize the residual.

3,573,625

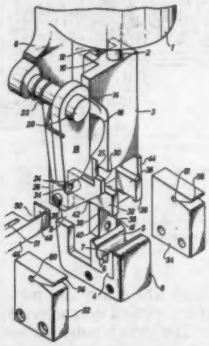
APPARATUS FOR TRIMMING AND SPLICING WIRES

Colin David Kindell, Bushey, and Terence Robert Raynor, London, England, assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of application Ser. No. 772,987, Nov. 4, 1968, now Patent No. 3,539,707. This application Nov. 15, 1968, Ser. No. 776,199

Int. Cl. H01r *43/04*

U.S. Cl. 29—203 **10 Claims**



A crimping tool carries out both trimming and splicing operations in a single stroke so that the wires are trimmed between the ends of a connector; the wires do not sag and the trimmed wire ends lie within the connector. The tool has a pair of wire-trimming blades mounted for rotation on either side of the path of a movable die, which blades cooperate with trimming edges extending along such path. Each wire is oriented so as to be within the path of movement of one trimming blade and outside the path of movement of the other.

3,573,626

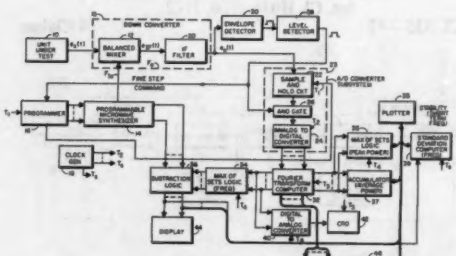
AUTOMATIC RADIO FREQUENCY PULSE MEASUREMENT SYSTEM

Robert J. Ertman, Monroe County, N.Y., assignor to General Dynamics Corporation

Filed Mar. 29, 1968, Ser. No. 717,124

Int. Cl. H04b *1/16*

U.S. Cl. 325—67 **12 Claims**



The microwave pulse signal measurement system described herein automatically derives the Fourier power spectrum of a microwave pulse train from a unit under test and simultaneously measures the frequency at which the microwave pulses have their maximum power. The input microwave pulses are mixed with local signals generated in a microwave synthesizer which is controlled by a programmer to change the frequencies of the local signals in discrete steps. The intermediate frequency burst obtained from the mixer upon occurrence of each microwave pulse is sampled and translated into digital information. A Fourier transform computer obtains from this digital information, output information as to the power density of different frequency components across the spectrum of the microwave pulse. This digital information can be displayed on an oscilloscope or a plotter to provide a visual presentation of the power spectrum of the microwave pulse. The computer outputs are also translated into digital outputs corresponding to the Fourier component having maximum power. These digital outputs may be subtracted from digital outputs obtained from the synthesizer which represent the frequency of the local signals to produce a number directly indicating the frequency at which the microwave pulse has its maximum power.

3,573,627

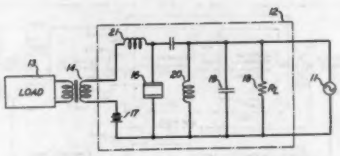
APPARATUS INCLUDING LSA OSCILLATOR CIRCUITS

John A. Copeland, III, Gillette, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Continuation-in-part of application Ser. No. 647,419, June 20, 1967, now Patent No. 3,508,169. This application Jan. 25, 1968, Ser. No. 700,403

Int. Cl. H03b *19/14*

U.S. Cl. 325—105 **3 Claims**



In one embodiment, an input signal is applied to an LSA oscillator circuit where it mixes with the oscillatory frequency f_{LSA} to give a difference frequency f_a that is amplified. In another embodiment, a signal of frequency f_a applied to an LSA oscillator modulates the oscillatory output frequency. In another embodiment, an input frequency f_a mixes with the oscillatory frequency to give an amplified sum frequency. In all the above embodiments, f_a conforms to the relationship

$$f_a \leq \frac{f_{LSA}}{Q}$$

where Q is the quality factor of the oscillator resonance circuit. A simple Doppler-effect radar is disclosed in which an LSA oscillator provides an output transmitted frequency and also detects and amplifies input frequency shifts indicative of the velocity of a target. The amplitude modulation phenomenon can be employed in a microphone in which a diaphragm is used to vary the quality factor Q of the LSA oscillator resonant circuit.

3,573,628

ANTENNA FOR MINIATURE RADIO RECEIVER INCLUDING PORTIONS OF RECEIVER HOUSING AND CHASSIS

Joseph F. Cramer, Jr., Downers Grove, Ill., and Thomas M. Yackish, Hammond, Ind., assignors to Motorola, Inc., Franklin Park, Ill.

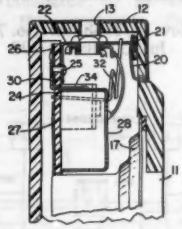
Filed July 15, 1968, Ser. No. 744,837

Int. Cl. H04b *1/18, 1/08*

U.S. Cl. 325—361 **10 Claims**

Antenna for radio receiver of the capacitively loaded vertical ground plane type wherein an active vertical portion is formed by parts of the receiver and is connected to a conductive escutcheon to form a capacitive loading structure

for the vertical antenna. The lower end of the vertical antenna is connected to shield cans and grounded conductors on the chassis which form an effective ground plane. The

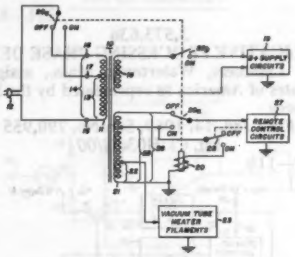


signal from the top of the vertical antenna is coupled through a matching circuit to the base of a transistor. A jack for connecting an external antenna is connected between the ground plane and a point on the vertical antenna.

3,573,629
TRANSFORMER POWER SUPPLY FOR REMOTE CONTROLLED RECEIVERS WITH PROVISION FOR FAST WARM-UP

Donald F. Buell, Baldwinsville, N.Y., assignor to General Electric Company

Filed Apr. 1, 1969, Ser. No. 811,756
Int. Cl. H04b *1/06*
U.S. Cl. 325—390 **5 Claims**

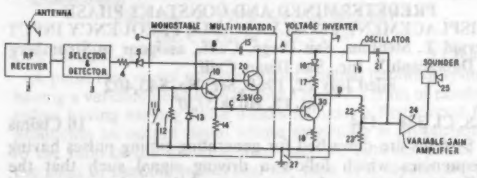


A transformer power supply for a remote controlled receiver provides reduced filament power in the OFF condition by increasing the primary to secondary turns ratio for the filament supply winding when the receiver is turned OFF. At the same time, the number of turns in the secondary winding supplying the remote control circuits is increased in the same ratio as the increase in the primary turns so as to maintain a constant operating voltage to the remote control circuits, thus enabling the receiver to be turned ON remotely. Switching of the turns in the various windings is provided by a relay connected across the low-voltage portion of the remote control supply winding.

3,573,630
TIME VARIABLE ALERT TONE CIRCUIT FOR PERSONAL RADIO PAGING SYSTEMS

Steven M. Baer, Red Bank, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Sept. 30, 1968, Ser. No. 763,780
Int. Cl. G08b *3/10*
U.S. Cl. 325—392 **3 Claims**

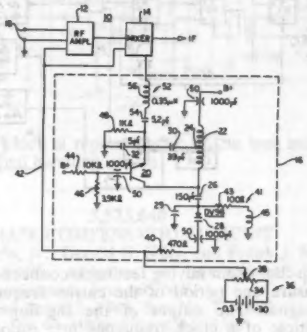


The present invention concerns a method for varying over a period of time the alert tone in a personal radio-paging receiver making extensive use of signal voltages already present in the circuit and decreasing the overall drain on the receiver supply battery.

3,573,631
OSCILLATOR CIRCUIT WITH SERIES RESONANT COUPLING TO MIXER

David J. Carlson, Indianapolis, Ind., assignor to RCA Corporation

Filed Aug. 30, 1968, Ser. No. 756,620
Int. Cl. H03j *3/18;* **H04b** *1/28;* **H04n** *5/44*
U.S. Cl. 325—439 **9 Claims**

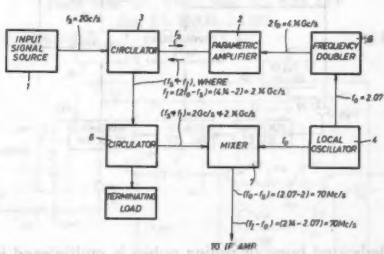


An oscillator circuit tuned by a voltage dependent variable capacitance diode is coupled to a mixer stage by a wide band injection circuit which includes a series connected inductor and capacitor adapted to series resonate at a frequency within the oscillator tuning range. A resistor interconnects the voltage dependent variable capacitance diode and a tuning bias potential supply. The resistor is of a value to cause the tuning of the oscillator circuit to track the tuning of the other circuits controlled by the bias supply.

3,573,632
COMBINED PARAMETRIC AMPLIFIER AND MIXER ARRANGEMENT

Hans Kuhn, 7530 Pforzheim, Oberer Wingertweg 90, Germany, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Nov. 9, 1967, Ser. No. 681,621
Claims priority, application Germany, Nov. 25, 1966, ST26212
Int. Cl. H04b *1/26*
U.S. Cl. 325—445 **7 Claims**

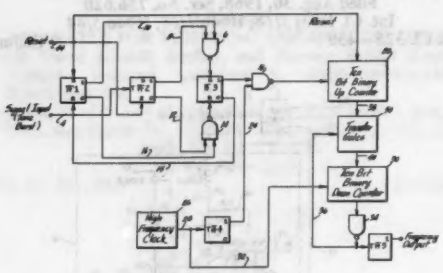


An arrangement comprising a parametric amplifier, a mixer, an oscillator coupled to the mixer, a frequency doubler coupled to the oscillator to provide a pump frequency for the amplifier, and a source of input signals coupled to the amplifier wherein the idler frequency and amplified input signals are combined with the oscillator signals in the mixer to produce two sideband signals of the same frequency that are combined resulting in a single sideband signal output of the mixer having increased amplitude.

3,573,633
TONE BURST TO FREQUENCY GENERATOR

Michael T. Marrero, Casselberry, Fla., assignor to the United States of America as represented by the Secretary of the Navy

Filed May 26, 1969, Ser. No. 827,595
Int. Cl. H03k 23/00
U.S. Cl. 328—30 10 Claims

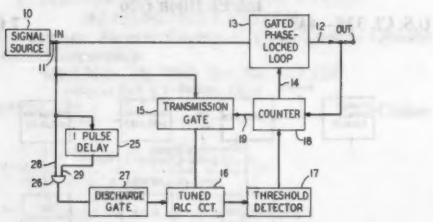


A flip-flop chain having feedback connections is arranged to measure one period of the carrier frequency of a tone burst signal. The output of the flip-flop chain gates a submultiple of a clock frequency into a count-up counter during the measured period. A countdown counter is arranged to count at clock frequency. Each time the countdown counter counts through zero, the count stored in the count-up counter is read out nondestructively into the countdown counter which simultaneously sends an output signal to a flip-flop. The divided and shaped output from the flip-flop is a continuous measure of the tone burst carrier frequency.

3,573,634
TIMING OF REGENERATOR AND RECEIVER APPARATUS FOR AN UNRESTRICTED DIGITAL COMMUNICATION SIGNAL

Todd L. Rachel, Elmira, N.Y., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Sept. 4, 1968, Ser. No. 757,314
Int. Cl. H03k 5/00
U.S. Cl. 328—63 5 Claims

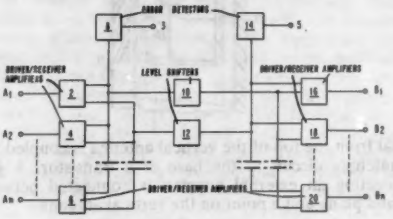


A dedicated burst of timing pulses is multiplexed in each frame of an unrestricted digital signal to supply timing information to receiver and regenerator circuits in a time division communication system. When the burst appears in the received signal the output of a tuned RLC circuit builds up to a threshold level. A threshold detector then triggers a time control circuit, which in one embodiment of the invention is a counter circuit and in another embodiment of the invention is a pair of monostable multivibrator circuits, to gate the digital signal to a timing recovery circuit for the duration of the burst.

3,573,635
PULSE TRANSFER SYSTEM

Donald J. Da Costa, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1968, Ser. No. 776,647
Int. Cl. H03k 17/00
U.S. Cl. 328—103 5 Claims

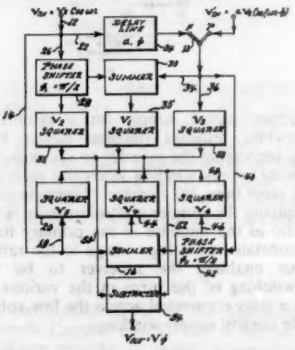


Two groups of terminals are interconnected by circuitry which transfers a pulse from any one terminal of the first group to all terminals of the second group and vice versa. Each terminal is connected to a common transfer system through an individual amplifier circuit which permits simultaneous bidirectional pulse transfers. The amplifiers are arranged to inhibit transfers of signals from one terminal of a group to the remaining terminals of the same group.

3,573,636
MULTIPLICATIVE PROCESSING PHASE DETECTOR

Uve H. W. Lammers, Watertown, Mass., assignor to the United States of America as represented by the Secretary of the Air Force

Filed Jan. 14, 1969, Ser. No. 790,955
Int. Cl. H03d 3/00
U.S. Cl. 329—110 2 Claims



A nonintegrating frequency or phase detector utilizing a plurality of square law detectors in a circuit having sinusoidal input signals and generating a DC output signal as a function of the phase angle difference between the input signals.

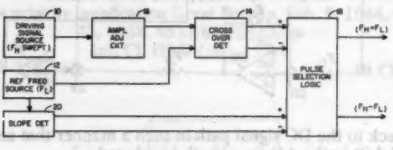
3,573,637
TIMING SYSTEM WITH OUTPUT REPRESENTING PREDETERMINED AND CONSTANT PHASE DISPLACEMENT FROM VARIABLE FREQUENCY INPUT

Jerald T. Stebbins, San Diego, Calif., assignor to Stromberg DatagraphiX, Inc., San Diego, Calif.

Filed July 22, 1969, Ser. No. 843,402
Int. Cl. H03k 5/20
U.S. Cl. 328—114 16 Claims

Systems are described for generating timing pulses having frequencies which follow a driving signal such that the difference between the frequency of the timing pulses and the driving signal remains constant even with variations in

the driving signal frequency. A sinusoidal driving signal and a triangular waveform having a frequency equal to the desired difference between the input driving signal and the output pulse train are compared so as to provide outputs corresponding to the crossovers therebetween. Pulse

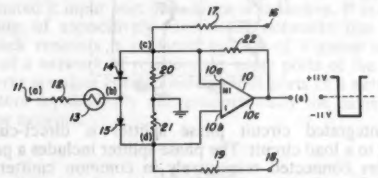


selection logic which is enabled in accordance with the slope of the triangular waveform provides the output pulses which may have output frequencies equal either to the sum of the input and the triangular wave frequency or the difference therebetween.

3,573,638
BIPOLAR THRESHOLD DETECTOR

Henry L. Cox, Jr., Anapolis, and Carl O. Buhlman, Columbia, Md., assignors to the United States of America as represented by the Secretary of the Navy

Filed Aug. 15, 1969, Ser. No. 850,501
Int. Cl. H03k *5/20*
U.S. Cl. 328—115 **10 Claims**



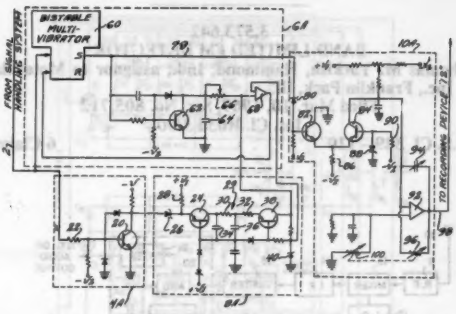
A pair of diodes steer signals into a bias network to block bipolar input signals having magnitudes within a preset range, and, to pass positive signal excursions exceeding the preset range, to one input of an operational amplifier, and, to direct negative signal excursions less than the bipolar range to another input of an operational amplifier. A quiescent positive output signal, representing a quiescent state when input signals are within the preset range is present at the amplifier output so long as the bipolar input signal stays within the preset range. When bipolar excursions exceed or are less than the preset range, the operational amplifier produces a negative output signal. A feedback loop connects the amplifier output to one of its inputs to ensure snap-action level detection by means of a regenerative feedback.

3,573,639
RATEMETER WITH AUTOMATIC DEAD-TIME CORRECTION

Arthur J. Metz, Portland, Oreg., and Robert H. Howard, Hickory Hills, Ill., assignors to the United States of America as represented by the United States Atomic Energy Commission

Filed Dec. 4, 1969, Ser. No. 882,247
Int. Cl. H03k *5/00, 21/00*
U.S. Cl. 328—127 **5 Claims**

A pulse rate meter receiving from a signal handling system having a variable dead time during a time *T* a train of random pulses having varying pulse widths includes a first circuit for producing an output signal whose amplitude is proportional to the ratio of the summed time intervals between pulses in the train of random pulses and the time *T*, a second circuit for producing, responsive to each random pulse, an output pulse whose width is inversely proportional to the output signal of the first circuit, and a third circuit for integrating the output pulses of the second circuit to produce a rate

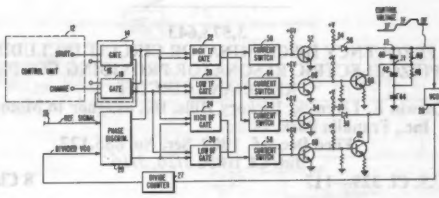


meter output which is representative of the true pulse rate input to the signal handling system.

3,573,640
PHASE COMPENSATION CIRCUIT

Carl P. Hollstein, Jr.; Gerald H. Kiltz, and Frank J. Sordello, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 23, 1968, Ser. No. 754,883
Int. Cl. H03b *3/04;* **G05f** *3/00*
U.S. Cl. 328—155 **2 Claims**

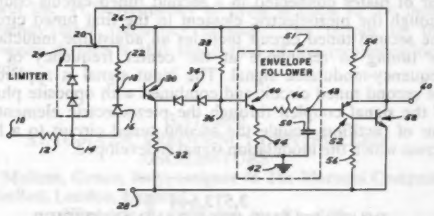


A phase compensation circuit incorporates series capacitors shunted by resistance means, with the signal channeled through the circuit so that there is virtually no loss of DC gain.

3,573,641
ELECTRONIC FILTER

George E. Zenk, Minneapolis, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

Filed Mar. 27, 1967, Ser. No. 626,177
Int. Cl. H03b *15/00*
U.S. Cl. 328—165 **6 Claims**



A circuit for scanning celestial space and discerning the presence of bodies in a varying amplitude noise background is disclosed. Signal inputs provided by the sensor are compared to a signal indicative of the noise background envelope to eliminate the effect of the noise. A circuit for deriving the noise background envelope is also disclosed.

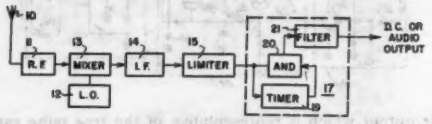
ERRATUM

For Class 329—110 see:
Patent No. 3,573,636

3,573,642
BAND-LIMITED FM DETECTOR

Thomas M. Yackish, Hammond, Ind., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Mar. 10, 1969, Ser. No. 805,712
Int. Cl. H03d 3/00
U.S. Cl. 329—110 6 Claims

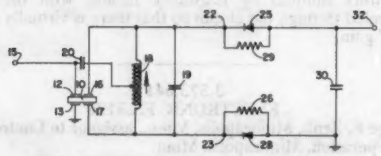


The output IF signal of an FM receiver is coupled to an AND gate and also used to actuate a timer. The timer output is coupled to a second input of the AND gate and the initial output of the timer enables the AND gate for a fixed predetermined time period. The initial portion of the IF signal disables the AND gate while the terminal portion of each cycle of the IF signal enables the AND gate. The AND gate puts out a signal consisting of a series of pulses which are filtered or integrated to develop an output signal, which is a linear function of the frequency over the band of the FM detector.

3,573,643
FREQUENCY DISCRIMINATOR CIRCUIT INCLUDING PIEZOELECTRIC RESONATOR PROVIDING COUPLED RESONANT CIRCUIT

Corwin E. Livenick, Hickory Hills, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed Dec. 15, 1969, Ser. No. 885,122
Int. Cl. H03d 3/26, 3/16
U.S. Cl. 329—117 8 Claims



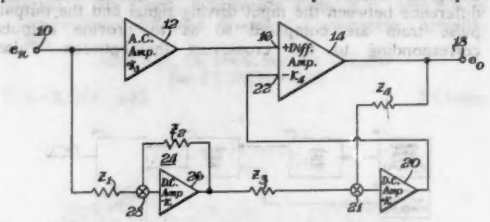
Frequency discriminator including piezoelectric element with first set of plates forming input tuned circuit and second pair of plates connected in a second tuned circuit coupled through the piezoelectric element to the first tuned circuit. The second tuned circuit includes an adjustable inductance for tuning to resonance at the center frequency of the frequency-modulated signal. The input signal is applied to the second tuned circuit and combined with opposite phases of the signal coupled through the piezoelectric element. A pair of rectifiers couple the second tuned circuit to a load across which the modulation signal is developed.

3,573,644
DC STABILIZED WIDE BAND AMPLIFIER

Eddie A. Evel, Colorado Springs, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Mar. 20, 1969, Ser. No. 808,777
Int. Cl. H03f 1/02
U.S. Cl. 330—9 2 Claims

A wideband stabilized wide band amplifier is constructed to have two signal paths, one designed for optimum high-frequency performance and the other designed for optimum low frequency and DC performance. The signals in the two paths are combined in a differential amplifier and the output

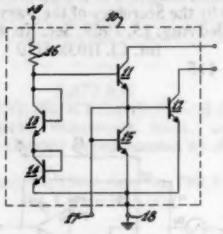


fed back to the DC signal path in such a manner that any DC signal drift in the AC signal path is reduced.

3,573,645
PHASE SPLITTING AMPLIFIER

Carl Franklin Wheatley, Jr., Somerset, N.J., assignor to RCA Corporation

Filed June 30, 1969, Ser. No. 837,382
Claims priority, application Great Britain, Sept. 27, 1968, 46152/68
Int. Cl. H03f 3/26
U.S. Cl. 330—15 10 Claims

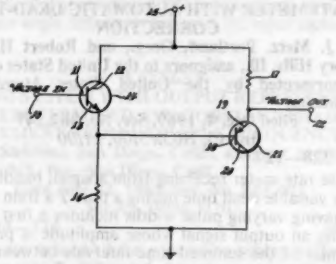


An integrated circuit phase splitter is direct-current coupled to a load circuit. The phase splitter includes a pair of transistors connected respectively in common emitter and base configurations. A signal input circuit is coupled to the emitter electrode of the common base transistor and to the base electrode of the common emitter transistor. Biasing means, including a pair of forward biased diodes, are provided in the base circuit of the common base transistor for establishing the quiescent current of that transistor as a function of the diode current. Another diode which is connected in series with the common base transistor is also connected between the input electrodes of the common emitter transistor to establish the common emitter transistor current equal to that of the common base transistor.

3,573,646
HIGH STABILITY EMITTER FOLLOWER

Pieter De Wit, Baltimore, Md., assignor to the United States of America as represented by the Secretary of the Air Force

Filed July 17, 1969, Ser. No. 842,530
Int. Cl. H03f 3/18
U.S. Cl. 330—17 5 Claims



An emitter follower apparatus having a low impedance output which is independent of temperature by cancelling the

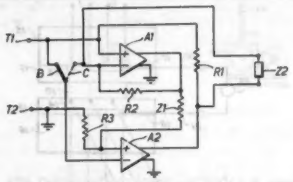
voltage drifts due to base-emitter diode changes in two cascaded emitter followers.

3,573,647

ELECTRICAL IMPEDANCE CONVERTING NETWORKS

Andreas Antoniou, Hounslow, England, assignor to Her Majesty's Postmaster General, London, England

Filed Feb. 7, 1969, Ser. No. 797,564
Claims priority, application Great Britain, Feb. 9, 1968, Oct. 22, 1968, 6533/68;50113/68
Int. Cl. H03f *1/00, 15/00*
U.S. Cl. 330—69 **10 Claims**



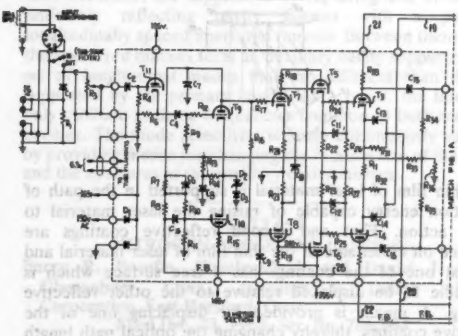
This specification describes networks having gyrator properties. Each network comprises two differential amplifiers, and four resistors (conveniently equal) connected in positive and negative feedback paths about the amplifiers. The feedback connections are such that the networks are unconditionally stable. When a network is capacitively terminated it input port impedance is inductive. If in each of a group of capacitively terminated networks one of the feedback resistors is replaced by one of a group of input ports of a network of resistors the input ports of the gyrator networks simulate corresponding input ports of a network of inductors topologically and proportionally the same as the resistor network.

3,573,648

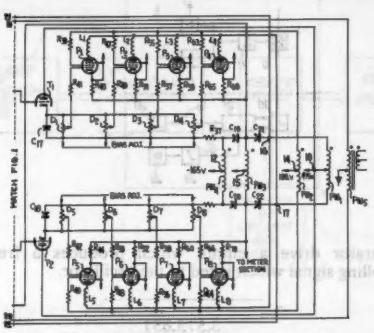
HIGH POWER AUDIO AMPLIFIER HAVING FEEDBACK PROVIDED BY A WINDING CO-FILAR WITH AN OUTPUT TRANSFORMER PRIMARY WINDING

Mioljub R. Nestorovic, Endwell, N.Y., assignor to McIntosh Laboratory, Inc., Binghamton, N.Y.

Filed Feb. 17, 1969, Ser. No. 799,867
Int. Cl. H03f *1/36, 3/28*
U.S. Cl. 330—82 **14 Claims**



A high-power audio amplifier employing both cathode and anode load unity coupled cofilarly wound transformer primary windings, providing negative feedback by means of a transformer winding which is cofilar with respect to the output windings and have the same number of turns. Individual tube bias controls are employed for all output tubes.

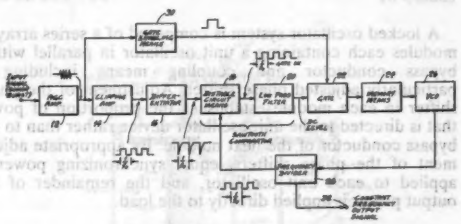


3,573,649

FREQUENCY-LOCK CIRCUIT

Gerald W. West, Seattle, Wash., assignor to the United States of America as represented by the Secretary of the Navy

Filed Jan. 8, 1969, Ser. No. 789,728
Int. Cl. H03b *3/04*
U.S. Cl. 331—14 **5 Claims**



A circuit for locking the frequency of an oscillator to that of a received signal. The latter is amplified, clipped and differentiated before being fed to a phase-lock loop comprising, in series, a phase comparator, low-pass filter, gating means, memory means and a voltage-controlled oscillator (VCO). The output of the VCO is fed back through a frequency divider to the phase comparator. The comparator produces a symmetrical output when the circuit input and output frequencies are equal and an unsymmetrical output when the frequencies differ. The unsymmetrical output provides a DC level when filtered, which is used to control the VCO frequency to bring it back to the input frequency after frequency division. The output of the frequency divider is also the output of the frequency-lock circuit.

3,573,650

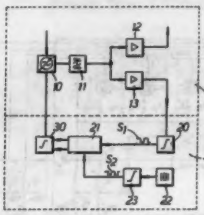
AUTOMATIC FREQUENCY CONTROLLED OSCILLATORS

Ugo Maltese, Genoa, Italy, assignor to The Marconi Company Limited, London, England

Filed Apr. 7, 1969, Ser. No. 814,136
Claims priority, application Italy, Apr. 11, 1968, 51261-A
Int. Cl. H03b *3/04*
U.S. Cl. 331—27 **8 Claims**

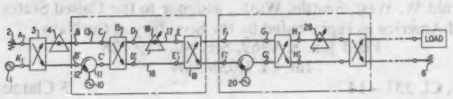
Automatic frequency control means for oscillator arrangement of modulatable frequency wherein signals from the oscillator, and signals from a reference source are compared in a comparator which produces signals dependent on the frequency difference of the oscillator and the

reference at one or other of two outputs, in dependence upon the sense of said difference. The signals from the



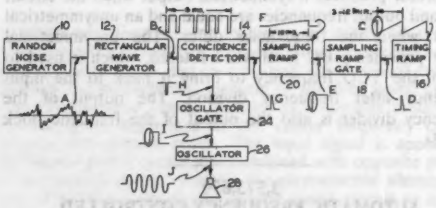
comparator drive a circuit which produces a frequency controlling signal which is fed to the oscillator.

3,573,651
LOCKED OSCILLATOR ARRANGEMENT
Rudolf S. Engelbrecht, Bernardsville, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.
Filed Dec. 11, 1968, Ser. No. 783,056
Int. Cl. H03b 7/06
U.S. Cl. 331—56 **8 Claims**



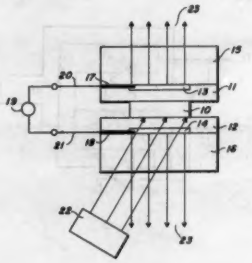
A locked oscillator system is composed of a series array of modules each containing a unit oscillator in parallel with a bypass conductor and coupling means including a particularly adjusted phase shifter. Adjustment of the phase shifter in each module establishes the proportion of power that is directed to the unit oscillator device rather than to the bypass conductor of the next module. By appropriate adjustment of the phase shifters, equal synchronizing power is applied to each unit oscillator, and the remainder of the output power is applied directly to the load.

3,573,652
RANDOM INTERVAL TIMER
Thomas H. Charters, 6855 S.W. Raleighwood Way, Portland, Oreg. 97225
Filed Mar. 7, 1969, Ser. No. 805,339
Int. Cl. H03b 29/00
U.S. Cl. 331—78 **13 Claims**



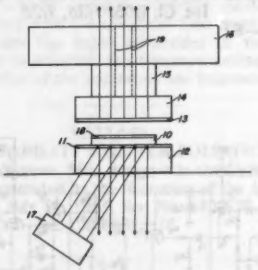
Apparatus according to the present invention produces an output at random time intervals following a Poisson distribution. A first pulse generator means, comprising first and second time delay circuits, produces a first periodic pulse having a period on the order of minutes. A second pulse generator means provides a second repetitive pulse having a predetermined average period which is much less than the period of the first pulse, with the exact time of occurrence of the second pulse being modulated by a random noise signal. A coincidence detector indicates time coincidence between the first and second pulses and causes an audible output to be produced. The duty factor of the second pulse predetermines the chance for coincidence.

3,573,653
CONTINUOUSLY TUNABLE THIN FILM LASER EMPLOYING THE ELECTRIC FIELD EFFECT
Vern N. Smiley, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy
Filed July 18, 1969, Ser. No. 842,915
Int. Cl. H01s 3/10
U.S. Cl. 331—94.5 **7 Claims**



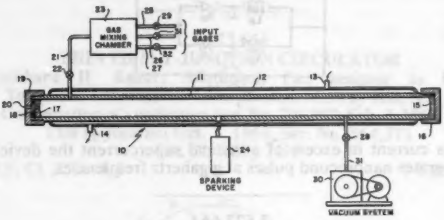
A selectively tunable thin film laser comprises a source of excitation energy and a thin film of laser material positioned to intercept the excitation energy. Conductive means are positioned on either side of the laser material and insulated therefrom; a source of selectively variable electrical potential is connected to the conductive means to generate a variable electric field therebetween so as to tunably change the wavelength of the laser output.

3,573,654
NARROW BAND TUNABLE LASER OSCILLATOR AMPLIFIER
Vern N. Smiley, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy
Filed July 18, 1969, Ser. No. 842,939
Int. Cl. H01s 3/10
U.S. Cl. 331—94.5 **10 Claims**



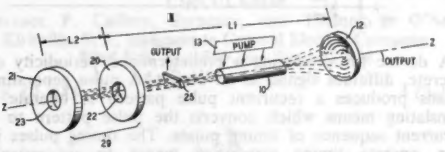
A thin film of laser material is supported in the path of excitation energy capable of raising the laser material to lasing action. First and second reflective coatings are disposed on either side of the thin film of laser material and at least one of the coatings has a free surface which is adaptable to be displaced relative to the other reflective coating. A means is provided for displacing one of the reflective coatings, thereby changing the optical path length of the laser cavity which is formed by the laser material and the reflective coatings and producing a commensurate change in the wavelength of emitted laser energy; thus, the laser assembly is selectively tunable over a relatively narrow band of wavelengths.

3,573,655
COMBUSTION LASER
Billie J. Graham, Lothian, Md. 20820
Filed July 30, 1968, Ser. No. 748,872
Int. Cl. H01s 3/00
U.S. Cl. 331—94.5 10 Claims



A molecular gas combustion laser includes a sealed metal tube having reflecting mirrors at each end thereof. A suitable mixture of gases is introduced under pressure into the tube chamber and ignited by an electrical sparking device thereby producing lasing action. The laser output is taken from a small orifice provided in one of the reflecting mirrors. System cooling is achieved by means of a water jacket surrounding the metal tube.

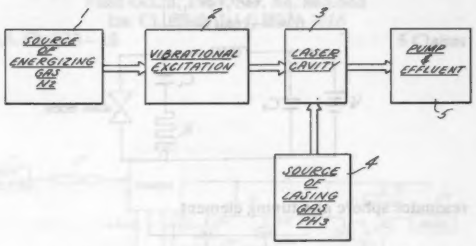
3,573,656
LASER OSCILLATOR WITH MODE SELECTOR
Enrique A. J. Marcatili, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 23, 1968, Ser. No. 786,225
Int. Cl. H01s 3/00
U.S. Cl. 331—94.5 7 Claims



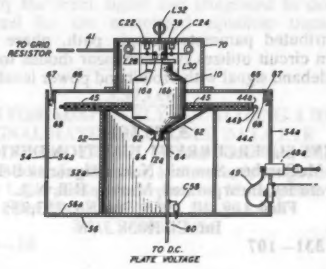
Unwanted longitudinal modes, typically generated by a laser oscillator, are suppressed by replacing one of the two uniformly reflecting cavity mirrors with a pair of longitudinally spaced apertured mirrors. Between themselves, the apertured mirrors form an auxiliary cavity supportive of a set of longitudinal modes that are different than the set supported by the primary cavity. As a result, the laser can only oscillate at those frequencies common to both resonant cavities. The mode selectivity is made continuously variable by providing means for changing the relative size of the beam and the apertures in the auxiliary cavity mirrors.

3,573,657
NITROGEN-PHOSPHINE LASER (U)
Barry R. Bronfin, Weathersfield, and Daniel J. Seery, Glastonbury, Conn., assignors to United Aircraft Corporation, East Hartford, Conn.
Filed Dec. 23, 1968, Ser. No. 786,484
Int. Cl. H01s 3/22
U.S. Cl. 331—94.5 4 Claims

A gas laser utilizes vibrationally excited nitrogen as an energizing gas and, through resonant collisions with a lasing gas, transfers the energy to the lasing gas, preferentially to an upper laser energy level. The lasing gas is phosphine, which is preferably introduced directly into the laser cavity free of prior excitation so as to avoid molecular dissociation. Laser energy at 8.3, 7.5 and 30.0 microns is produced.



3,573,658
TANK CAVITY RESONATOR FOR USE IN HIGH FREQUENCY OSCILLATOR
George R. Hair, Clifton, N.J., and John G. Nielsen, Wantagh, N.Y., assignors to Bondit Corp., Newark, N.J.
Filed Mar. 12, 1969, Ser. No. 806,544
Int. Cl. H03b 5/10
U.S. Cl. 331—96 10 Claims

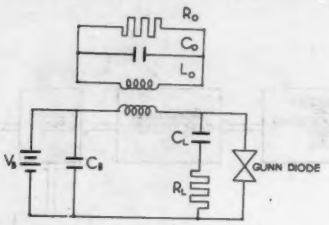


A tank cavity resonator, including plate tuning capacitance, plate blocking capacitance, and tank inductance, for use in high frequency (e.g. UHF) oscillators, comprises a pair of concentric metallic cylinders, an outer and an inner cylinder, closed at one end by a common baseplate. A planar, three-layer (metal-insulator-metal), member forming the plate blocking capacitor contacts the other end of the inner cylinder and is spaced from a movable planar metallic member which contacts the other end of the outer cylinder, thereby forming a variable plate tuning capacitor. The tank inductance is formed by the current path which includes the outer surface of the inner cylinder, the upper surface of the baseplate and the inner wall of the outer cylinder.

3,573,659
FERRIMAGNETICALLY TUNABLE GUNN OSCILLATOR
Michael Dydyk, Long Island City, N.Y., assignor to Loral Corporation, Bronx, N.Y.
Filed Feb. 20, 1969, Ser. No. 800,985
Int. Cl. H03b 7/14
U.S. Cl. 331—99 4 Claims

A very wide frequency tuning (5.8 to 13.0 GHz) Gunn

effect oscillator using the properties of a ferrimagnetic resonator sphere as a tuning element.

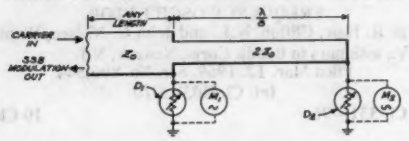


3,573,660

BROADBAND, REFLECTION-TYPE SINGLE SIDEBAND MODULATORS

Robert V. Garver, Boyds, and Richard N. Johnson, Gaithersburg, Md.

Filed Apr. 24, 1969, Ser. No. 819,064
Int. Cl. H03c *1/52*
U.S. Cl. 332—45 **6 Claims**



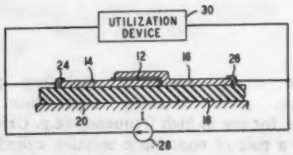
A distributed parameter, single path, phase differential reflection circuit utilizes two nonlinear diodes to generate a single sideband signal with broadband power levels.

3,573,661

SNS SUPERCURRENT JUNCTION DEVICES

Dean E. McCumber, Summit, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 20, 1968, Ser. No. 753,955
Int. Cl. H03k *3/38*
U.S. Cl. 331—107 **14 Claims**



A supercurrent device includes a superconductor-normal metal-superconductor (SNS) structure which has a current-voltage characteristic analogous to that of Josephson tunnel junctions but relies on a proximity effect rather than tunneling. Several devices employing the SNS structure are disclosed: a basic cryogenic switch or logic device, pulse generators and parametric devices.

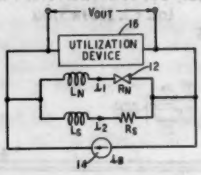
3,573,662

WEAK-LINK SUPERCURRENT PULSE GENERATORS

Theodore A. Fulton, North Plainfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Aug. 20, 1968, Ser. No. 753,987
Int. Cl. H03k *3/38*
U.S. Cl. 331—107 **16 Claims**

A weak-link supercurrent pulse generator includes an inductive-resistive circuit connected across an interfacial region having a finite zero voltage current characteristic of, but not limited to, Josephson tunnel junctions. When driven by a current in excess of a critical supercurrent the device generates nanosecond pulses at gigahertz frequencies.

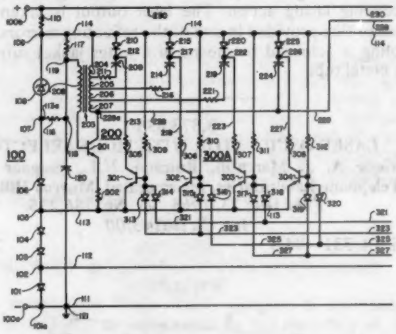


3,573,663

FREQUENCY CONTROL CIRCUIT

Henry Martin Huge, Bay Village, and Benny K. Barnes, Lorain, Ohio, assignors to Lorain Products Corporation

Filed Feb. 10, 1969, Ser. No. 804,350
Int. Cl. H03b *5/12*
U.S. Cl. 331—117 **11 Claims**



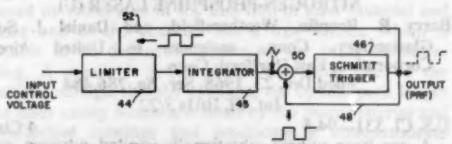
A device for producing a predetermined periodicity of discrete, different signals at an output. A pulse generating means produces a recurrent pulse pattern to operate a translating means which converts the pulse pattern to a recurrent sequence of timing pulses. The timing pulses in turn operate timing responsive means to successively energize each of a plurality of frequency determining circuits thereby establishing a multiplicity of different discrete, constant amplitude frequencies delivered sequentially in accordance with the periodicity of the timing pulses and the sequential operation of the timing responsive means.

3,573,664

VOLTAGE CONTROLLED OSCILLATOR CONSISTING OF A BISTABLE MULTIVIBRATOR WITH FEEDBACK CIRCUITS

Don M. Jacob, 7912 Cowan Ave., Los Angeles, Calif. 90045

Original application May 2, 1968, Ser. No. 726,118, now Patent No. 3,475,753. Divided and this application July 29, 1969, Ser. No. 846,657
Int. Cl. H03k *3/02*
U.S. Cl. 331—143 **9 Claims**



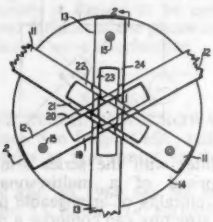
A voltage controlled oscillator capable of producing a square-wave pulse repetition frequency, and characterized by a constant-percentage change in square-wave PRF at the

output per volt change at the input. The VCO includes a limiter, integrator and Schmitt trigger connected seriatim.

ERRATUM

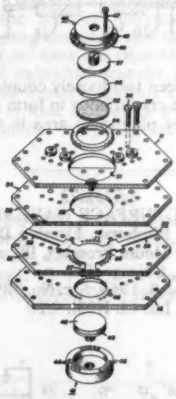
For Class 332—45 see:
Patent No. 3,573,660

3,573,665
THIN FILM Y-JUNCTION CIRCULATOR
Reinhard H. Knerr, Allentown, Pa., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, N.J.
Continuation of application Ser. No. 795,907, Feb. 3, 1969. This application Oct. 7, 1969, Ser. No. 864,371
Int. Cl. H01p 1/32
U.S. Cl. 333—1.1 **7 Claims**



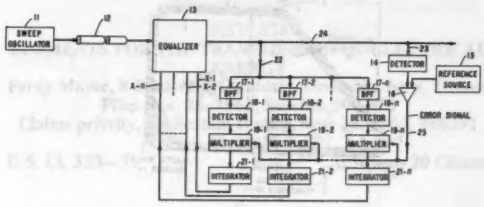
A Y-junction strip line circulator adapted to thin film construction techniques. It has been discovered that if the 12 crossings in a Y-junction circulator of the type having two split inner conductors per branch are laid down in a perfectly symmetrical manner, the capacitance of these crossings can be made to resonate with the inductance of the conductors thus eliminating the extra, external capacitance heretofore believed necessary for strip line circulators.

3,573,666
FREQUENCY ADJUSTABLE MICROWAVE STRIPLINE CIRCULATOR
Terence P. Caffrey, Syracuse, and Thomas J. O'Neill, Kirkville, N.Y., assignors to General Electric Company
Filed Feb. 27, 1969, Ser. No. 802,924
Int. Cl. H01p 5/12, 3/08
U.S. Cl. 333—1.1 **4 Claims**



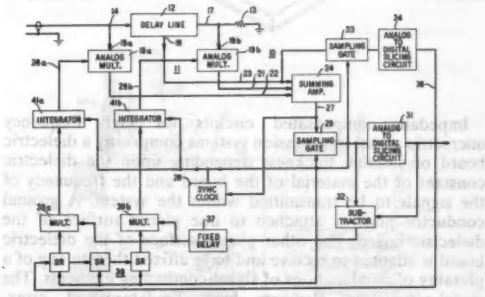
A microwave stripline circulator is disclosed which is adjustable for operation over a wide range of frequencies. This is accomplished by a combination of an incremental coarse tuning means and a fine tuning means. The coarse tuning means comprises an arrangement providing for a selectable number of attachment screws around the periphery of the resonator disc of the circulator, and the fine tuning means comprises an arrangement for providing adjustable pressure to a garnet disc positioned at the resonator disc.

3,573,667
AUTOMATIC EQUALIZER ADJUSTMENT APPARATUS
Chih-Yu Kao, Lawrence, and Carl F. Kurth, Andover, Mass., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Oct. 8, 1969, Ser. No. 864,664
Int. Cl. H04b 3/14; H03h 7/16
U.S. Cl. 333—18 **5 Claims**



An equalizer of a coaxial transmission system is automatically adjusted by applying a sweep signal to the equalizer and comparing the output of the equalizer with a predetermined reference signal to develop an error signal. The output signal of the equalizer is simultaneously converted into a plurality of weighting signals, each representing the energy content of the output signal within a passband which includes one equalizer transmission network characteristic, i.e., "bump." Each weighting signal is multiplied by the error signal and integrated to develop a control signal for the associated equalizer transmission network.

3,573,668
SYSTEM FOR ADAPTIVELY EQUALIZING A DATA SIGNAL HAVING A CLOSED DATA EYE
Edward C. Bender; Donald Hirsch, Matawan, N.J., and Harry R. Rudin, Jr., Thalwil, Switzerland, assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Dec. 5, 1968, Ser. No. 781,453
Int. Cl. H04b 3/04
U.S. Cl. 333—18 **5 Claims**



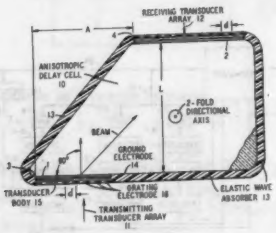
The automatic transversal filter equalizer is modified for improved startup performance in the presence of high initial distortion by providing control signals for adaptive adjustment of tap multipliers from correlations of the polarity of unequalized received data samples, rather than the polarity of data samples in the equalizer output, with the polarity of an error component in the equalizer output.

3,573,669

DISPERSIVE DELAY CELL USING ANISOTROPIC MEDIUM

Emmanuel P. Papadakis, Allentown, Pa., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 3, 1968, Ser. No. 756,770
Int. Cl. H03h 9/30; H01v 7/02
U.S. Cl. 333—30 8 Claims



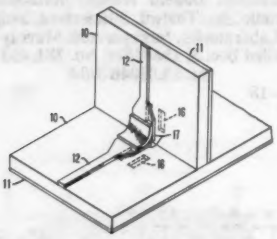
An elastic wave dispersive delay cell which uses a cell body of an elastically anisotropic delay medium and a pair of spaced transducer arrays disposed on opposing parallel surfaces of the body to achieve nonlinear dispersion.

3,573,670

HIGH-SPEED IMPEDANCE-COMPENSATED CIRCUITS

John R. Skobern, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1969, Ser. No. 809,350
Int. Cl. H03h 7/38; H01p 3/08
U.S. Cl. 333—33 11 Claims



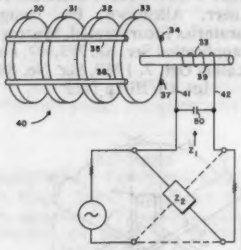
Impedance-compensated circuits for high frequency microstrip signal transmission systems comprising a dielectric board of suitable thickness depending upon the dielectric constant of the material of the board and the frequency of the signals to be transmitted within the system. A ground conductor plate is attached to one planar surface of the dielectric board. The other planar surface of the dielectric board is adapted to receive and have affixed thereto any of a plurality of combinations of signal-conducting elements. The signal-conducting elements have predetermined cross-sectional areas depending upon the signals to be transmitted within the system. Due to microminiature construction, the signal-conducting elements may be provided with lead and circuit-connecting areas of increased size to facilitate making electrical connections for devices to be attached with the elements. The impedance changes due to the increased size of areas are compensated for by means of slots or apertures in the ground conductor plate opposite or in the vicinity of the connecting areas.

3,573,671

LATTICE-TYPE FILTERS EMPLOYING MECHANICAL RESONATORS HAVING A MULTIPLICITY OF POLES AND ZEROS

Robert A. Johnson, Tustin, and Roger J. Teske, Santa Ana, Calif., assignors to Collins Radio Company, Cedar Rapids, Iowa

Filed Nov. 18, 1968, Ser. No. 776,496
Int. Cl. H03h 9/32, 9/26
U.S. Cl. 333—72 13 Claims



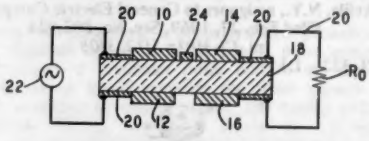
A lattice-type filter with the series arm and crossarm impedances comprised of a multiresonant mechanical structure having a plurality of arrangeable poles and zeros. The multiresonant structure can comprise a plurality of discs with their axes lying along a common line. Coupling wires secured to the disc perimeters hold them in place and transmit energy. The input means is a coil wound on a magnetostrictive rod secured to an end disc.

3,573,672

CRYSTAL FILTER

Irvin E. Fair, Treasure Island, Fla., and Edwin C. Thompson, Hokendauqua, Pa., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 30, 1968, Ser. No. 771,843
Int. Cl. H04r 17/00; H01r 7/00
U.S. Cl. 333—72 3 Claims



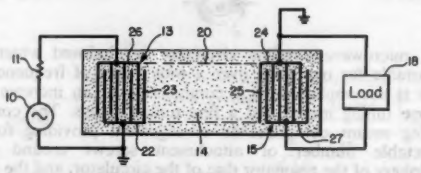
The coupling between two loosely coupled electrode pairs mounted on the same crystal body to form a monolithic filter is vernier adjusted by plating an area in the interelectrode region.

3,573,673

ACOUSTIC SURFACE WAVE FILTERS

Adrian J. De Vries, Elmhurst; Fleming Dias, Chicago, and Thomas J. Wojcik, Mount Prospect, Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Jan. 8, 1969, Ser. No. 789,839
Int. Cl. H03h 9/20
U.S. Cl. 333—72 7 Claims



A body of piezoelectric material is capable of propagating acoustic surface waves and a first transducing device is

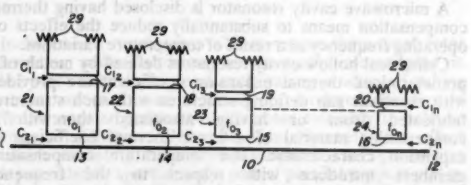
coupled to a surface of the body to develop those waves. Spaced on the same surface from that first device is a second transducing device. The spacing is sufficiently small that crosstalk exists between the devices. To reduce the magnitude of that crosstalk, one or more of several different decoupling arrangements are included. These comprise the connection of diametrically opposite transducer electrodes to a common plane of reference potential, the connection of the mutually closest electrodes of the respective transducers to a plane of common reference potential, the disposition of one or more ground electrodes between the transducers and across the path of wave propagation, the development across the transducers of signals balanced with respect to such a plane, the physical shielding of the space generally above one of the transducers, the inclusion of a conductive shield on the surface opposite the wave-propagating surface and the formation of shielding channels in that surface opposite the wave-propagating surface. In addition, the wave propagation path advantageously is caused to be oriented at an angle relative to the end surfaces of the piezoelectric body in order to minimize reflected wave interference.

3,573,674

TAILORED RESPONSE MICROWAVE FILTER

Donald R. Wehner, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed Apr. 30, 1969, Ser. No. 820,404
Int. Cl. H03h *7/14;* **H01p** *3/08*
U.S. Cl. 333—73 **1 Claim**



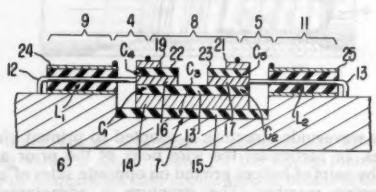
A multiple section microwave filter capable of being accurately tailored to special frequency response requirements over wide bandwidths in disclosed. The tailored response filter consists of an array of cascaded traveling-wave directional filters. Each filter section couples power out of a through transmission line into suitable microwave terminations. Due to the directional characteristics of traveling-wave directional filters, there is no interaction between sections. Thus the frequency response of the array is the product of the transfer functions of the individual sections. The coupling constants and the center frequencies of individual filter sections are tailored, i.e., synthesized, to result in a set of individual transfer functions which will produce the desired overall response. The tailored response filter can be used in wide bandwidth microwave systems for phase and amplitude weighting and for equalization functions.

3,573,675

HIGH FREQUENCY BAND PASS FILTER

Thomas C. Leonard, Topsfield, Mass., assignor to Varian Associates, Palo Alto, Calif.

Filed Aug. 13, 1969, Ser. No. 849,716
Int. Cl. H03h *7/10;* **H01p** *1/00*
U.S. Cl. 333—73 **5 Claims**



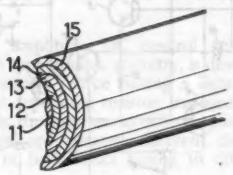
A high frequency band-pass filter is disclosed. The filter includes an input resonator and an output resonator decoupled by means of a capacitor common to both resonators. A pair of capacitors are provided for impedance transforming into and out of the resonators, respectively. The aforementioned capacitors and the two resonator capacitors are formed by a stack of insulatively immediately overlaying conductive plates stacked over a ground plane. The conductive plates have mutually opposed areas which decrease in the ascending direction of the stack. The two inductors of the tuned circuits are formed by a pair of short sections of transverse electromagnetic transmission line connected between a pair of plates in the stack and the ground plane.

3,573,676

ELEMENTS FOR THE TRANSMISSION OF ELECTRICAL ENERGY

Ferdy Mayer, 8 Boulevard Gambetta, Grenoble, Isere, France

Filed Nov. 26, 1965, Ser. No. 509,878
Claims priority, application France, Nov. 26, 1964, 996391
Int. Cl. H03h *7/02*
U.S. Cl. 333—79 **20 Claims**



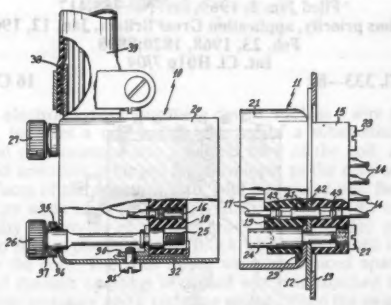
A device for transmitting electrical energy and including at least one conductive element whose structure is heterogeneous in the radial direction in that the element is composed of a plurality of concentric layers which are so selected that the value of at least one electrical or magnetic parameter of these layers varies progressively from one layer to the next, and hence in the direction of the radius of the element, the thickness of each layer being at least equal to the conventional skin effect thickness of that layer at a frequency which is at least equal to the cutoff frequency of the element.

3,573,677

CONNECTOR WITH PROVISION FOR MINIMIZING ELECTROMAGNETIC INTERFERENCE

Donald R. Detar, Stratford, Conn., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Feb. 23, 1967, Ser. No. 625,893
Int. Cl. H01h *7/14*
U.S. Cl. 333—79 **2 Claims**



An electrical connector provided with shielding and filtering of the contacts to suppress electromagnetic interference, i.e., leakage into or radiation of energy from the connector and conduction of undesired high-frequency current through the connector contacts. In the illustrative embodiment, the connector contacts are provided with filter

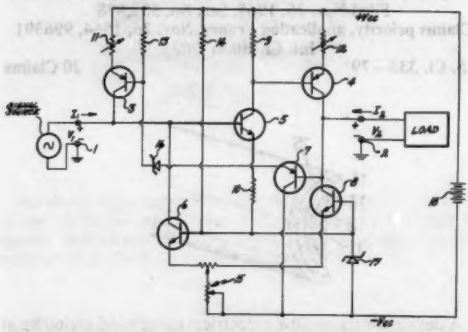
units which are held in place on the contacts by resilient noninductive contact washers which protect the fragile filter units against damage and connect the elements of the filter in circuit. The outer electrodes of the filter units are connected through conductive gaskets to a metal plate forming a common ground plane for the respective filters.

3,573,678

DIRECT COUPLED VARIABLE GYRATOR

William New, Jr., Los Angeles; Robert W. Newcomb, Palo Alto, Calif., and Douglas E. Treter, Uncasville, Conn., assignors to the United States of America as represented by the Secretary of the Air Force

Filed Apr. 11, 1969, Ser. No. 815,370
Int. Cl. H03h 7/44, 11/00
U.S. Cl. 333—80 3 Claims



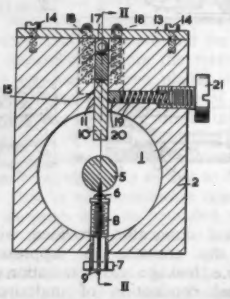
The gyrator of the present invention comprises an electronic circuit arrangement of transistors and resistance means in combination with unique biasing means which permit gyrator operation without the normally required input and output blocking capacitors. Transistor means connected to the input and output terminals of the gyrator perform as current to voltage converters and cooperate with a third intermediate voltage inverting transistor means and appropriate biasing resistors to achieve gyrator realization. The biasing means which includes a stable voltage source such as a Zener diode permits gyrator input and output to remain at zero potential during periods when no signal is applied.

3,573,679

TUNING APPARATUS FOR MICROWAVE RESONANT CAVITIES

Albert Henry Johnson, Mudeford, Christchurch, England, assignor to Minister of Technology in Her Britannic Majesty's Government United Kingdom, Great Britain and Northern Ireland, London, England

Filed Jan. 2, 1969, Ser. No. 788,417
Claims priority, application Great Britain, Jan. 12, 1968, Feb. 23, 1968, 1820;8898
Int. Cl. H01p 7/04
U.S. Cl. 333—82 16 Claims



A coaxial electromagnetically resonant cavity comprises a tuning vane which is parallel to the axis of the cavity and extends for substantially the whole length thereof, and adjusting means for varying the distance between the tuning vane and the inner conductor of the cavity.

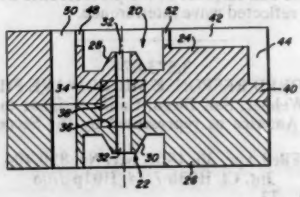
The vane may be either conductive or dielectric material slidably mounted in the structure of the cavity. The adjusting means may include a slidably mounted wedgelike member bearing against a surface of the tuning vane. The vane may be in two parts adjustably connected together.

3,573,680

TEMPERATURE COMPENSATION OF MICROWAVE CAVITY

Roger G. Carignan, Wilmington, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed Apr. 24, 1969, Ser. No. 818,885
Int. Cl. H01p 7/06, 1/30; H01j 23/70
U.S. Cl. 333—83 5 Claims



A microwave cavity resonator is disclosed having thermal compensation means to substantially reduce the effects on operating frequency as a result of temperature variations.

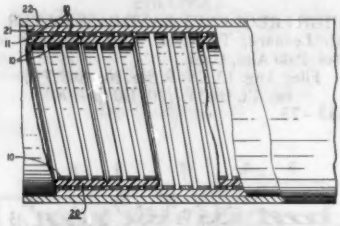
Cylindrical hollow cavity resonators defined by metals of a predetermined thermal expansion coefficient are provided with reentrant gap defining structures with such structures fabricated from or having associated therewith a compensating material of a lower thermal coefficient of expansion characteristic. The temperature compensating members introduce with respect to the frequency determining components of the resonator a substantially positive thermal coefficient of frequency to cancel and measurably offset the inherently negative thermal coefficient frequency variations due to the metallic composition of the cavity walls. Gridless as well as gridded cavity resonator structures comprise applicable embodiments as well as fixed frequency or tunable microwave devices.

3,573,681

HELICAL WAVEGUIDE FORMED FROM DIELECTRIC RIBBON HAVING SYMMETRICALLY DISPOSED CONDUCTIVE STRIPS ON OPPOSITE SIDES

Stewart E. Miller, Middletown Township, Monmouth County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 12, 1969, Ser. No. 806,662
Int. Cl. H01p 3/12, 3/08, 3/18
U.S. Cl. 333—95 1 Claim

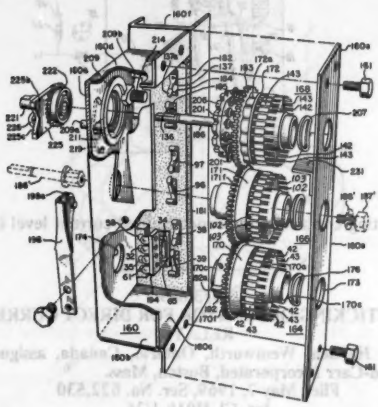


A helix waveguide structure is adapted to printed circuit techniques. In particular, the wire helix of the prior art is replaced by pairs of helices printed on opposite sides of a low loss dielectric member. The structure is advantageously fabricated by printing conductive strips on both sides of a dielectric ribbon and winding the ribbon into helix form.

3,573,682
STEP-BY-STEP ROTATABLE TELEVISION TUNER WITH OPEN-CENTER ROTOR ASSEMBLY

George R. Dickinson, Norridge, and Howard C. Grossenheider, Deerfield, Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Apr. 4, 1968, Ser. No. 718,786
Int. Cl. H03j *5/30*; H01h *19/58*; F16h *35/18*
U.S. Cl. 334—1 1 Claim

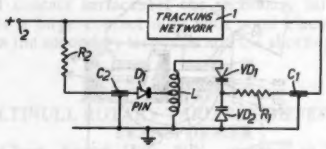


Included in a step-by-step VHF tuner are three small rotor assemblies, such as turrets, mechanically intercoupled in side-by-side relationship and each having a series of tuning elements selected ones of which are rendered effective in different angular positions of the rotor assembly to achieve tuning to different VHF television channels. To effect rotatable mounting, each rotor assembly has an open-center hub journaled in apertures of a pair of parallel support plates, such as opposite walls of the tuner housing. A channel selector shaft may be inserted into and keyed to the hub of any one of the rotor assemblies to effect simultaneous rotation of all three. One of the hubs, other than that receiving the tuning shaft, may be open along its entire axis to provide an access opening through the tuner to permit control of other functions in the receiver, such as control of a UHF tuner.

3,573,683
VARACTOR DIODE TUNED CIRCUIT HAVING SUBSTANTIALLY CONSTANT LOADED Q-FACTOR

Richard S. Marshall, and Allan S. Summers, Ilford, England, assignors to The Plessey Company Limited, Ilford, England

Filed May 29, 1968, Ser. No. 733,102
Claims priority, application Great Britain, June 2, 1967, 25491/67
Int. Cl. H03h *5/12*; H03j *3/20*
U.S. Cl. 334—15 8 Claims

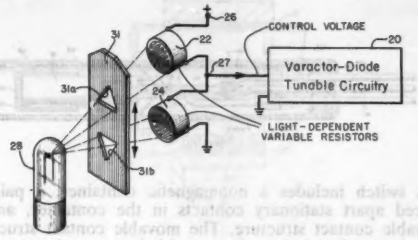


A tuned circuit arrangement comprising a tuned circuit having varactor diode means for the tuning thereof over a band of frequencies, and compensation means operative for providing selective damping to said tuned circuit so that the loaded Q-factor of the tuned circuit arrangement remains substantially constant over the frequency band.

3,573,684
TUNER FOR A WAVE SIGNAL RECEIVER

George R. Dickinson, Norridge, Ill., assignor to Zenith Radio Corporation, Chicago, Ill.

Filed Feb. 28, 1969, Ser. No. 803,215
Int. Cl. H03j *3/18, 5/24*
U.S. Cl. 334—15 4 Claims

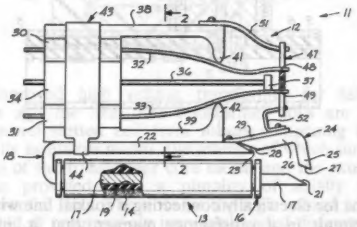


A variable amplitude DC control voltage, for tuning varactor-diode type tunable circuitry, is developed by a light-controllable voltage source having a light-sensitive device, such as a light-dependent resistor, exposed to an adjustable amount of light. In response to different discrete light levels, the control voltage assumes different discrete amplitude levels which in turn effect tuning to different broadcast channels.

3,573,685
ELECTROMAGNETIC SWITCHING DEVICE

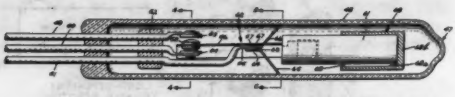
Robert F. Klose, Blacklick, and Virgil L. Marsh, Reynoldsburg, Ohio, assignors to Western Electric Company, Incorporated, New York, N.Y.

Filed Aug. 13, 1969, Ser. No. 849,683
Int. Cl. H01h *50/00*
U.S. Cl. 335—135 3 Claims



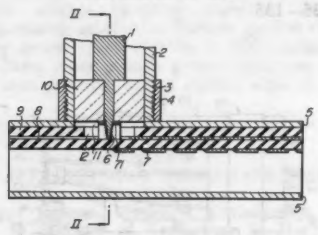
An electromagnetic switching device, such as a wire spring relay, includes a coil having one leg of a substantially U-shaped core inserted into a central bore of the coil. An L-shaped armature is hinged for movement to the core so that pole faces of the armature mate with associated pole faces of the core when an operating potential is applied to the coil. A plurality of groups of parallel wires are embedded in and extend from a plastic support block which is attached to one leg of the core. The ends of the wires are spaced apart and extend through openings in a card which is attached to the movable armature and a restoring spring. When the switching device is operated, the armature is moved so that the pole faces thereof mate with the associated pole faces of the core whereby the card is moved against the biasing of the restoring spring to bring together selected wires of the parallel groups of wires to facilitate electrical connections in external circuits connected to the opposite ends of the selected wires.

3,573,686
MAGNETIC SWITCH
Stanley R. Mitick, Morrison, Ill., assignor to General Electric Company
Original application Feb. 3, 1971, Ser. No. 795,876. Divided and this application Dec. 4, 1969, Ser. No. 882,043
Int. Cl. H01h 51/28
U.S. Cl. 335—153 5 Claims



A switch includes a nonmagnetic container, a pair of spaced apart stationary contacts in the container, and a movable contact structure. The movable contact structure includes a cylindrical section movable by magnetic attraction between opposed extreme positions for engaging the movable contact structure with the stationary contacts, the movable contact structure tending to rebound from the stationary contacts. A cylindrical damper of nonmagnetic material is loosely mounted about the cylindrical section to move with the cylindrical section with such lost motion that they collide approximately as the movable structure begins to rebound.

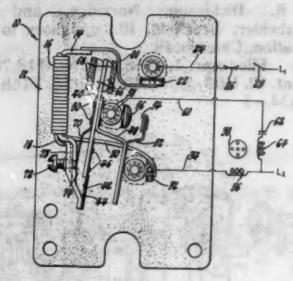
3,573,687
MEANS FOR CONNECTING COAXIAL LINE WITH SLOW WAVE CIRCUIT
Shigetsugu Watanabe, Kawasaki-shi, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan
Filed June 27, 1968, Ser. No. 740,654
Claims priority, application Japan, July 11, 1967, July 12, 1967, 42/45174;42/45408
Int. Cl. H01r 17/04; H01p 3/08
U.S. Cl. 339—177 2 Claims



Means for electrically connecting a coaxial line with a slow wave circuit in a satisfactory manner, that is, in such a manner as to avoid reflection at the portion of connection and to produce a mechanically strong connection.

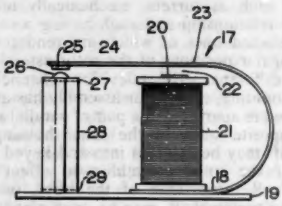
3,573,688
MOTOR RELAY
James A. Canter, Englewood, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed Nov. 26, 1969, Ser. No. 880,206
Int. Cl. H01h 3/00
U.S. Cl. 335—194 4 Claims

In preferred form a starting relay for an electric motor having a wire wound electromagnetic coil and a pivotal armature attached thereto. A normally open contact pair comprising one fixed contact and one movable contact on said armature are closed upon pivotal movement of said armature in response to electromagnetic force of the coil during motor start. A cantilevered leaf spring on said armature is contracted at its free end by a calibrating screw on the coil. Adjustment of the calibrating screw with respect to the leaf spring sets a predetermined spring bias in opposition to the electromagnetic force holding the armature against the coil and therefore the relay may be set to open



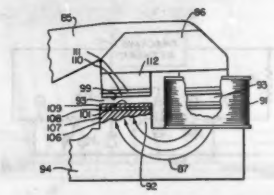
the starting contacts at a predetermined current level in the coil.

3,573,689
NONSTICKING OBTURATOR FOR DIRECT CURRENT RELAYS
Rodney Hayden, Wentworth, Ontario, Canada, assignor to United-Carr Incorporated, Boston, Mass.
Filed May 7, 1969, Ser. No. 822,530
Int. Cl. H01h 1/26
U.S. Cl. 335—196 1 Claim



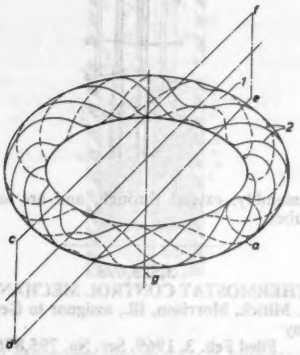
This invention relates to a nonsticking obturator for direct current relays.

3,573,690
ELECTRICAL SOLENOID ASSEMBLY
Chester G. Jones, Kettering, and Harold D. Neal, Dayton, Ohio, assignors to The National Cash Registor Company, Dayton, Ohio
Filed Oct. 6, 1969, Ser. No. 863,781
Int. Cl. H01f 1/00
U.S. Cl. 335—279 5 Claims



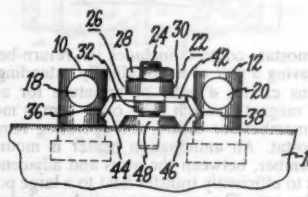
An electrical solenoid assembly having improved long life means for determining the length of the closed state air gap of the solenoid in combination with means for increasing operating efficiency through decreasing magnetic flux fringing at pole faces.

3,573,691
PLASMA CONTAINMENT SYSTEMS
John Bryan Taylor, Wallingford, England, assignor to United Kingdom Atomic Energy Authority, London, England
Filed Dec. 13, 1967, Ser. No. 690,153
Claims priority, application Great Britain, Dec. 14, 1966, 56093
Int. Cl. H01t 5/00
U.S. Cl. 335—299 3 Claims



A plasma containment system comprises a hollow torus having a solenoidal winding and either additional multiple helical windings wound in opposite direction on either side of a plane containing the major axis of the torus or a conductor on the minor axis of the torus arranged to carry current in opposite directions on either side of said plane.

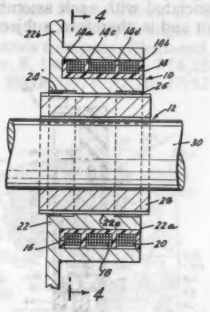
3,573,692
SECONDARY TERMINAL AND SHORTING DEVICE
Ralph B. Stetson, Durham, N.H., assignor to General Electric Company
Filed Sept. 19, 1969, Ser. No. 859,338
Int. Cl. H01f 27/04
U.S. Cl. 336—107 3 Claims



The secondary terminals of a current transformer are provided with a cutout section which provides a flat contact surface on each terminal. A short circuit member has a pair of depending angular legs having faces which are parallel to the flat contact surfaces of the secondary terminals. This provides a large contact area with good electrical contact between the secondary terminals and the shorting device.

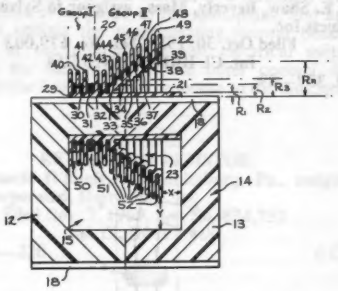
3,573,693
MULTINULL ROTARY VARIABLE DIFFERENTIAL TRANSFORMER
Jacob Chass, Forest Hills, N.Y., assignor to Pickering & Company, Inc., Plainview, N.Y.
Filed Mar. 6, 1969, Ser. No. 804,918
Int. Cl. H01f 21/06
U.S. Cl. 336—135 5 Claims

A rotary variable differential transformer having a plurality of null positions within 360 ° of mechanical rotation having each of two primary windings associated with a toothed magnetic ring, with the rings identical but angularly displaced and the primary windings wound in series opposition, and a secondary winding associated with a toothed rotor being rotatable with respect to the toothed rings whereby the



angular position of the rotor determines the voltage in the secondary winding from null to peak output.

3,573,694
HIGH VOLTAGE TRANSFORMER FOR TELEVISION RECEIVERS
Eugene K. Von Fange, Chesapeake; Julius Kemeny, Suffolk, and Sanjar Ghaem-Maghami, Chesapeake, Va., assignors to General Electric Company
Filed Oct. 28, 1969, Ser. No. 870,039
Int. Cl. H01f 27/30
U.S. Cl. 336—198 7 Claims

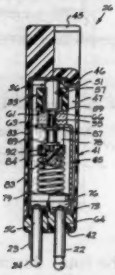


An improved high voltage transformer for television receivers and the like. The transformer coils are wound around novel slotted coil form means comprising hollow, electrically insulative means, the interior of which surrounds a portion of the transformer core means and the exterior of which is provided with a plurality of axially spaced circumferential slots. The slots for the high voltage windings are located at progressively increasing radial distances from the core means portion so as to provide a sufficiently great insulative barrier between the coil and the core means to prevent electrical arcing therebetween.

3,573,695
CIRCUIT PROTECTORS AND METHODS OF ASSEMBLING THE SAME
James B. Geyer, Baltimore; William D. O'Brien, Jr., Reisterstown, and Stephen A. Reisinger, Carney, Md., assignors to Western Electric Company, Incorporated, New York, N.Y.
Filed Sept. 18, 1969, Ser. No. 858,984
Int. Cl. H01h 61/00, 71/20; H01t 1/00
U.S. Cl. 337—29 13 Claims

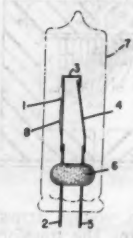
A circuit protector consisting of a pair of assemblies, each of which has both a spark-gap protector for excessive voltage and a heat-coil protector for excessive current buildup, is provided with two springs, one of which is associated with each assembly. Each spring holds various elements of one of the assemblies in abutment and propels a grounding pin

released by the associated heat-coil protector when excessive current buildup is encountered in an accompanying circuit. Only one spring is needed with each assembly because a contact pin associated with each assembly floats within the circuit protector and is, therefore, subject to the force of the



spring allowing the spring to urge the various elements of the assembly into abutment. By modifying a housing within which the assemblies are mounted, the assemblies are moved into close proximity to thereby minimize the width of the circuit protector.

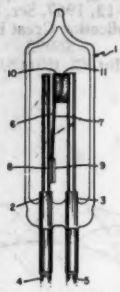
3,573,696
THERMOSTATIC SWITCH
Robert E. Shaw, Beverly, Mass., assignor to Sylvania Electric Products Inc.
Filed Oct. 30, 1967, Ser. No. 679,003
Int. Cl. H01h *37/04, 37/54*
U.S. Cl. 337—89 **9 Claims**



A thermostatic switch comprising a thermal snap-action element which is constraining, and in electrical contact with a spring element. On overheating, the thermal element snaps away from, and releases, the spring element, thereby breaking the electrical circuit. The released or unstrained position of the spring element is spaced from the thermal element in order to prevent electrical contact when the latter returns to its normal position.

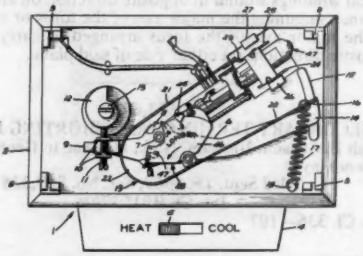
3,573,697
HERMETICALLY SEALED CIRCUIT BREAKER
Philip J. Dennis, Lynn, and Paul E. Gates, Danvers, Mass., assignors to Sylvania Electric Products Inc.
Filed Sept. 13, 1968, Ser. No. 759,649
Int. Cl. H01h *37/04, 37/54, 61/01*
U.S. Cl. 337—89 **5 Claims**

A circuit breaker having high amperage capacity includes a metallic snap-action element, capable of opening an electrical circuit upon thermal or current overload, disposed within a sealed glass envelope. Two metallic tubes are sealed to, and pass through, one end of the envelope. Lead-in conductors, which also serve as supporting members for the



breaker assembly, extend through, and are sealed to, the metallic tubes.

3,573,698
THERMOSTAT CONTROL MECHANISM
Stanley R. Mitick, Morrison, Ill., assignor to General Electric Company
Filed Feb. 3, 1969, Ser. No. 795,876
Int. Cl. H01h *37/14*, **H01h** *37/18*, **H01h** *37/52*
U.S. Cl. 337—103 **1 Claim**

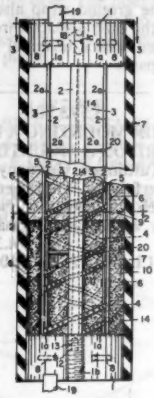


A thermostat control includes a return-bent bimetal member having a pair of longitudinally extending arms. One of the arms carries a yoke or armature for actuating an associated magnetic switch. The other arm is mounted to a pivotable member for setting the operating temperature of the thermostat. An anticipation heater is mounted on the bimetal member, between the arms and adjacent the return bend so as to efficiently transfer heat to a large portion of the bimetal element. The magnetic switch includes a pair of spaced stationary contacts and a movable contact structure, which is pivotable between extreme positions respectively engaging each of the stationary contacts. The movable contact structure includes a magnet, which moves in response to the relative positioning of an armature for pivoting the movable contact structure. The movable contact structure tends to rebound from its extreme positions. A damper of nonmagnetic material is loosely mounted about the magnet for movement therewith. There is sufficient lost motion between the magnet and damper that they collide approximately as the movable contact structure begins to rebound.

3,573,699
HIGH-VOLTAGE FUSE
Erwin Salzer, Waban, Mass., assignor to The Chase-Shawmut Company, Newburyport, Mass.
Filed Dec. 29, 1969, Ser. No. 888,257
Int. Cl. H01h *85/12, 85/14*
U.S. Cl. 337—161 **6 Claims**

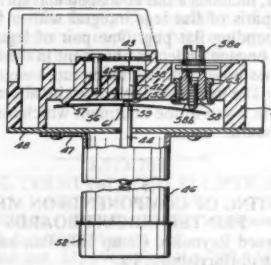
A subassembly for making a high-voltage fuse has a mandrel supporting a fusible element which is helically

wound around the same, and the mandrel is adapted to perform, in addition to its fuse-element-supporting function,



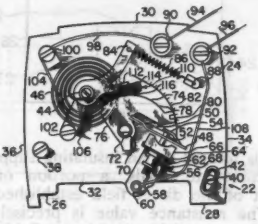
the function of controlling the arc voltage generated incident to blowing of the fuse.

3,573,700
ADJUSTABLE THERMOSTAT
Donald J. Schmitt, Mansfield, Ohio, assignor to Therm-O-Disc Incorporated, Mansfield, Ohio
Filed Nov. 29, 1968, Ser. No. 779,680
Int. Cl. H01h *37/18, 37/24, 37/54*
U.S. Cl. 337—347 **31 Claims**



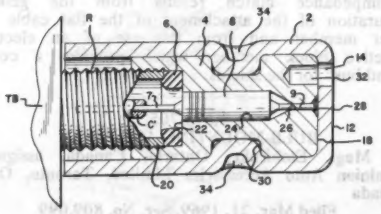
Bimetal free disc thermostats are disclosed which provide means for modifying the operating temperature of the disc and means for modifying the operating temperature differential of the disc. The operating temperature of the thermostat is adjusted by applying an adjustable biasing force to the snap disc urging it toward one position of stability. Adjustment of the force changes the temperature of operation without materially altering the displacement characteristics of the disc or the operating differential. The stability of the disc calibration is also improved by the biasing force which dampens the snap action. Operating temperature differential is adjusted by a biasing force applied to the disc only when the switch contacts are open. This latter force causes the disc to operate along one curve when the switch is closed and a displaced curve when the switch is open, thereby adjustably reducing operating temperature differential of the disc. A switch operator is arranged so that the kinetic energy of a mass in motion is available to break any contact welds. Further conventional disc structures may be arranged to operate at higher temperatures with relatively small operating temperature differentials by applying properly selected biasing forces to such conventional discs.

3,573,701
ANTICIPATION DROOP COMPENSATION FOR SPACE THERMOSTATS
Marvin M. Graham, San Pedro; Frank J. Heinz, Garden Grove, and Lambert F. Craemer, Orange, Calif., assignors to Robertshaw Controls Company, Richmond, Va.
Filed Nov. 8, 1968, Ser. No. 774,254
Int. Cl. H01h *37/14, 37/20, 37/52*
U.S. Cl. 337—378 **24 Claims**



A space thermostat comprising a first bimetal which controls the operation of an on-off electric switch, an anticipator disposed adjacent the first bimetal, and a compensating second bimetal having a delayed thermal response and disposed so as to compensate for the response of the first bimetal to the anticipator after it has been energized for a period of time greater than the delay of the compensating second bimetal. One embodiment utilizes the compensating second bimetal as a cam follower to mechanically rotate the first bimetal in a direction opposite to its deflection in response to the anticipator, and another embodiment utilizes the compensating second bimetal to move one of the contacts of the electrical switch to compensate for the effect on the other contact due to deflection of the first bimetal in response to the anticipator.

3,573,702
KEYED PLUG RESISTOR
Michael Francis O'Keefe, Mechanicsburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Nov. 7, 1969, Ser. No. 874,752
Int. Cl. H01c *13/00*
U.S. Cl. 338—220 **6 Claims**



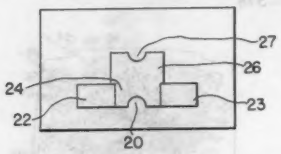
A plug device for use in conjunction with radio and television frequency circuits and coaxial cable applications is disclosed. The plug features a load resistor with one lead secured to the body of the plug and another lead adapted to insertably engage the contact-receiving member of a receptacle in a component. The resistor serves to load and subsequently balance the circuit to prevent signal distortion in house droplines or in the continuing remainder of the circuit. The plug also features a rotatable hardened shell which surrounds the body of the device and which rotates relative to the body. Keying means, including cooperating hole means between shell and body and a special keyed wrench device, provide a means by which the plug device may be removed, once installed. This rotatable shell feature in a plug device discourages illegal tampering with electronic equipment, such as theft of the cable signal by freeloaders.

3,573,703

RESISTOR AND METHOD OF ADJUSTING RESISTANCE

Darnall P. Burks, Williamstown, and John P. Maher, North Adams, Mass.

Filed May 9, 1969, Ser. No. 823,350
Int. Cl. H01c 7/00
U.S. Cl. 338—309 2 Claims



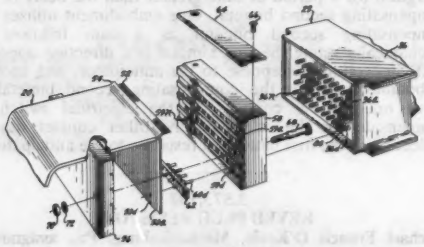
A resistor is formed on an insulating support between a pair of electrode terminals, a portion of the resistor extending out of the direct field established between the electrodes. The resistance value is precisely adjusted by removing resistor material in the fringing field.

3,573,704

FLATLINE CABLE IMPEDANCE MATCHING ADAPTER

Carl R. Tarver, Phoenix, Ariz., assignor to General Electric Company

Filed June 23, 1969, Ser. No. 835,388
Int. Cl. H01r 3/06
U.S. Cl. 339—14 26 Claims



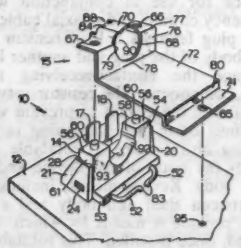
A connector is shown that is capable of interconnecting a shielded stripline flat cable adapter and another adapter for a group of conventional coaxial cables and at the same time maintaining an impedance match between the two adapters. The impedance match results from the geometric configuration of the attachment of the flat cable to its adapter member and from the use of an electrically conductive block member which provides a common "ground bus" for the shields.

3,573,705

BULB-MOUNTING ASSEMBLY

Hugo Magi, Etobicoke, Ontario, Canada, assignor to Dominion Auto Accessories Limited, Toronto, Ontario, Canada

Filed Mar. 21, 1969, Ser. No. 809,099
Int. Cl. H01r 3/06, 13/32
U.S. Cl. 339—14 6 Claims



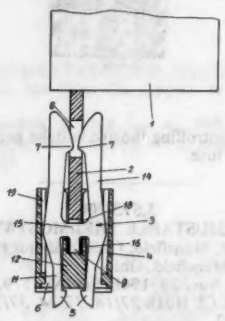
A socket assembly for a bulb, consisting of two nonconductive parts fastened together, and several conductive members. One of the parts provides a base, while the other is upstanding from the base and defines a semicylindrical recess opening away from the base. A single-piece conductive ground strap stamped from sheet metal is provided to form a semicylinder to define with the recess a socket aperture. The ground strap also has a shield portion which shields from the bulb a space through which a wire can pass to be connected with a terminal at a location between the nonconductive parts.

3,573,706

CONNECTOR FOR MOUNTING A PRINTED CIRCUIT BOARD ON A MOUNTING BAR

Roland Haberlen, Tuttlingen, Germany, assignor to J. Hengstler K. G. Zaherlerfabrick, Tuttlingen, Germany

Filed Feb. 25, 1969, Ser. No. 802,053
Claims priority, application Germany, Mar. 9, 1968, P 16 50 974.3
Int. Cl. H01r 13/50; H05k 1/00
U.S. Cl. 339—17 2 Claims



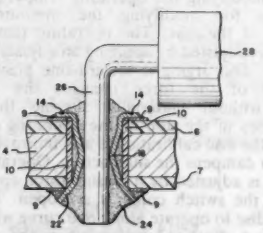
A device for connecting a printed circuit board to a mounting bar, includes a flat H-shaped leaf spring having first and second paris of flat legs integral with a flat crosspiece having a depending flat peg. One pair of legs has opposing hooks which engage under an abutment in the bar. The other pair of legs has noses with camming faces engaging in a hole in the board. The crosspiece overlays the abutment while the peg engages in a slot in the abutment which also receives the edge of the board.

3,573,707

MOUNTING OF COMPONENTS ON METALLIC PRINTED CIRCUIT BOARDS

Charles Edward Reynolds, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sept. 5, 1969, Ser. No. 855,648
Int. Cl. H01b 17/20; H05k 1/08
U.S. Cl. 339—17 11 Claims



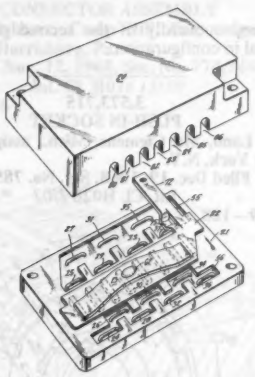
Component mounting system for metallic printed circuit boards having insulating coatings on their surfaces is disclosed in which the drilled hole in the metallic board is lined with a thin walled liner of plastic tubing. A metallic receptacle is positioned in the liner so that the liner electrically insulates the receptacle from the metallic portion of the printed circuit board. The lead wire from the

component is inserted into the receptacle and the board is solder-dipped to electrically connect the lead wire to a connecting path on the board. The heat from the soldering operation causes the liner to radially expand so that it achieves a tight fit in the hole. The board acts as a heat sink for the components mounted thereon but the board is electrically isolated from the components excepting where it is used as a grounding plane.

3,573,708
TAP BLOCK ASSEMBLY

Charles J. Yarrick, Haddonfield, and Lee A. Davis, Audubon, N.J., assignors to I-T-E Imperial Corporation, Philadelphia, Pa.

Filed July 22, 1969, Ser. No. 843,523
Int. Cl. H01r *25/00*
U.S. Cl. 339—18 **8 Claims**

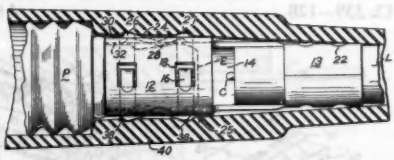


A tap block assembly for connecting one or more circuits to a common conductor by the insertion of a conductive plug. All components are captured between upper and lower molding halves which are secured together. A plurality of plug positions are provided in which the plug makes electrical contact with two respective circuits and a common conductor.

3,573,709
SPARK PLUG TERMINAL WITH ELLIPTICAL CROSS SECTION BARREL

Howard A. Elliott, Detroit, Mich., assignor to Essex International, Inc., Fort Wayne, Ind.

Filed Jan. 31, 1969, Ser. No. 795,634
Int. Cl. H01r *11/22, 13/44;* **H01t** *13/04*
U.S. Cl. 339—26 **11 Claims**

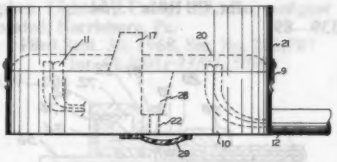


A terminal for a spark plug includes an elongated barrel having an elliptical cross section. A pair of elongated resilient spark plug electrode holding and contact tabs are positioned on the major axis of the barrel and the barrel is split adjacent the minor axis thereof to allow the barrel to flex. The elliptical shape of the barrel prevents overstressing and deformation of the tabs when the barrel is moved in a direction generally perpendicular to its axis, the electrode contacting the internal surface of the barrel in preference to the tabs.

3,573,710
MEANS AND METHOD FOR INSULATING CONNECTORS FROM AMBIENT ATMOSPHERE DURING MATING

Delbert R. Wofford, Owensboro, Ky., assignor to Texas Gas Transmission Corporation, Owensboro, Ky.

Filed Nov. 4, 1968, Ser. No. 773,048
Int. Cl. H01r *13/52*
U.S. Cl. 339—36 **6 Claims**

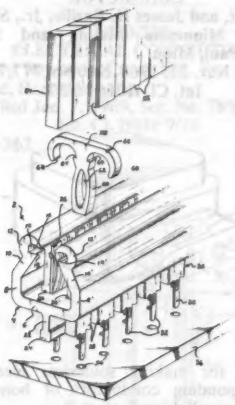


Connector means in a hermaphroditic embodiment provides for insulating connector terminals from ambient atmosphere such as salt water during mating by means of a covering of mastic insulation over exposed terminals. The mastic is displaced by frictional pressure during connection to provide a continuous insulation film surrounding all exposed electrical terminals.

3,573,711
MULTICONTACT ELECTRICAL CONNECTOR

Homer Ernst Henschen, Carlisle, Pa.; assignors to AMP Incorporated, Harrisburg, Pa.

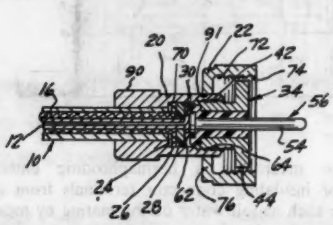
Filed Nov. 25, 1968, Ser. No. 778,470
Int. Cl. H01r *13/48, 13/64*
U.S. Cl. 339—61 **8 Claims**



Multicontact electrical connector comprises an elongated channel-shaped housing having a web and upstanding sidewalls, an axially extending rib being provided on the underside of the web. The sidewalls extend upwardly then inwardly towards each other and have, on their opposed inner surfaces, longitudinally extending channels adjacent to their upper ends. The contact terminals are mounted in the housing by inserting them through holes in the web on opposite sides of the rib so that intermediate portions of the terminals are supported by the web. The upper ends of the terminals have means thereon for interengagement with the grooves or channels on the inner surfaces of the sidewalls. The connector assembly comprising the housing and the terminal is supported on the printed circuit mother board by the lower portions of the terminals which are disposed

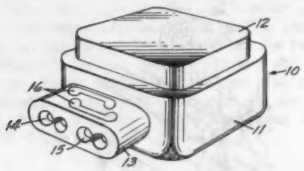
externally of the housing web. The rib functions to support the terminals against lateral movement when a mating element is inserted into the connector.

3,573,712
SOLDERLESS COAXIAL CONNECTORS
James W. Shirey, Lakeland, Mich., assignor to John Schroeder, Howell, Mich., a fractional part interest
Continuation-in-part of application Ser. No. 673,852, Oct. 9, 1967, now abandoned. This application Aug. 28, 1968, Ser. No. 769,773
Int. Cl. H01r *13/54*
U.S. Cl. 339—89 **6 Claims**



Solderless plug and union connectors for coaxial shielded cables, having a body member provided with a prong or alternately a union junction contacting the stripped end of the inner conductor bent in the form of a loop disposed in a transverse plane, the prong being electrically insulated from the remainder of the body which is electrically connected to the outer tubular braided conductor of the cable having its end clamped between a dielectric washer and a shoulder portion of a hollow sleeve member mechanically and electrically connected to the connector body.

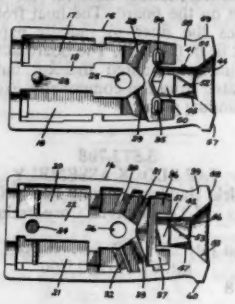
3,573,713
CONNECTOR
Dennis J. Enright, and James H. Bazille, Jr., St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.
Filed Nov. 21, 1968, Ser. No. 777,714
Int. Cl. H01r *11/20*
U.S. Cl. 339—98 **4 Claims**



A connector for making solderless electrical contact between corresponding conductors of bonded wire-pairs each having two parallel conductors.

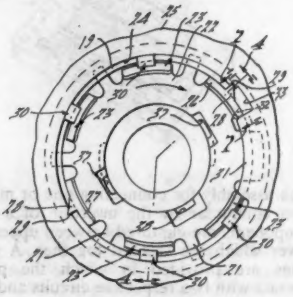
3,573,714
ELECTRICAL CONNECTOR
Prescott K. Turner, Fairfield, Conn., assignor to General Electric Company
Filed Mar. 27, 1969, Ser. No. 811,107
Int. Cl. H01r *13/56*
U.S. Cl. 339—101 **10 Claims**

A connector, for an electric cord having at least two conductors enclosed in a jacket of noncircular cross section configuration, includes a body of electrical insulating material defining a passageway for entry of the cord into the connector. The passageway includes a first portion of cross-sectional size and shape complementary to an adjacent region of the cord jacket so as to intimately surround the adjacent region. The passageway also includes a second portion, outwardly of the first portion, which smoothly changes in cross-sectional shape from that of the first portion so as to approach a circular cross-sectional shape. There is a



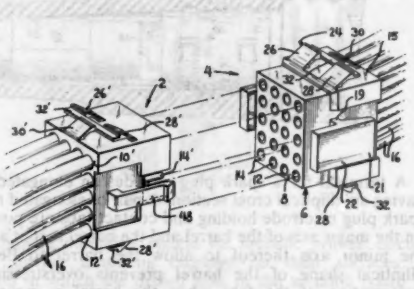
third portion, outwardly of the second portion, which is frustoconical in configuration.

3,573,715
PUSH-IN SOCKET
Don L. De Lano, Mt. Clemens, Mich., assignor to Microdot Inc., New York, N.Y.
Filed Dec. 19, 1968, Ser. No. 785,314
Int. Cl. H02b *1/02*
U.S. Cl. 339—128 **10 Claims**



The socket is releasably applied in locked position to an apertured support by the act of directly pushing the socket into the aperture.

3,573,716
CONNECTOR HOUSING HAVING MEANS FOR MOUNTING IN A PANEL OPENING
William Joseph Garver, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Dec. 26, 1968, Ser. No. 786,954
Int. Cl. H02b *1/02*
U.S. Cl. 339—128 **4 Claims**



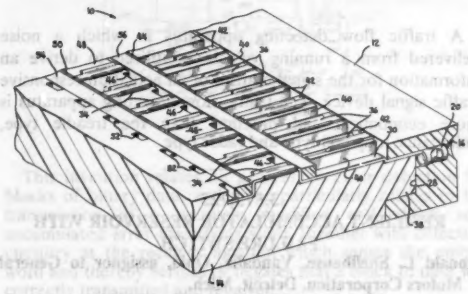
Electrical connector housing has improved means for mounting in a panel opening comprising a pair of trusslike

structures on opposite sides of the housing. Each trusslike structure comprises diagonally extending beams and a ridge piece which extends between the beams and is integral with their ends. Mounting of the housing in a panel is achieved by inserting the housing though the opening until the surface portions of the panel which are adjacent to the opening engage the beams thereby to resiliently deform the trusslike structures until the ridge pieces of the structures are coplanar with the plane of the panel at which time the resiliently deformed beams urge the ridge pieces against the edges of the panel opening and maintain the housing in position.

ERRATUM

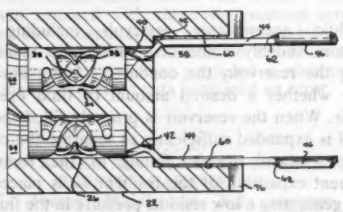
For Class 339—157 see:
Patent No. 3,573,850

3,573,717
CONNECTOR ASSEMBLY
Linn Stephen Lightner, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Nov. 12, 1968, Ser. No. 774,744
Int. Cl. H01r *13/50*
U.S. Cl. 339—176 **6 Claims**



An electrical connector assembly is disclosed and comprises a contact housing and cooperating connector block. A plurality of electrical contacts are disposed in the housing and have tab means extending therefrom and overlying the connector block. Locating means are incorporated within the connector block for orienting the contact tabs to facilitate connection of the assembly with external circuitry.

3,573,718
MINIATURE ELECTRICAL CONNECTOR
Linn Stephen Lightner, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Sept. 16, 1968, Ser. No. 759,971
Int. Cl. H05k *1/07*; H01r *13/50*
U.S. Cl. 339—176 **9 Claims**

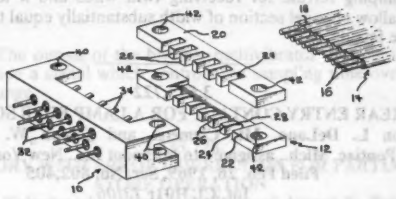


An electrical connector for a board or other panel member having wire conductors or printed circuitry associated therewith and comprising a housing formed of a dielectric material having a plurality of electrical contacts mounted therein. The contacts are provided with tab portions which permit easy insertion into the housing and the housing is provided with shoulder means for cooperating with the tab portions to retain the contacts in position.

ERRATUM

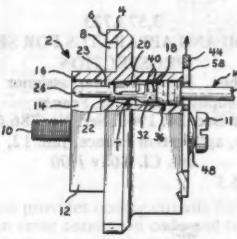
For Class 339—177 see:
Patent No. 3,573,687

3,573,719
CONNECTOR FOR MULTIPLE-CONDUCTOR CABLE
Linn Stephen Lightner, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Sept. 30, 1968, Ser. No. 763,707
Int. Cl. H01r *33/94*, *5/04*
U.S. Cl. 339—196 **9 Claims**



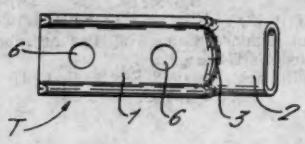
An electrical connector for multiple-conductor electrical cable having a housing containing a plurality of contact means having contact tabs extending therefrom. A header block is adapted to receive the multiple-conductor cable to orient the conductors in staggered relation along two planes. The header block is insertable within the housing whereby the contact tabs will electrically engage the conductors of the cable.

3,573,720
ELECTRICAL CONNECTOR
Charles Edward Reynolds, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Jan. 7, 1969, Ser. No. 789,454
Int. Cl. H01r *9/16*
U.S. Cl. 339—217 **6 Claims**



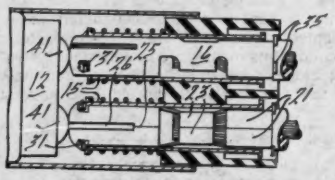
A pair of insulating electrical connector blocks has a plurality of cavities having contact terminals therein. The terminals are sealed in their respective cavities against the passage of moisture or gas. The terminals are locked in their respective cavities by shutter plates on the rearward ends of the blocks. The shutter plates slidably move a limited amount in one direction to align the large ends of keyhole slots with each cavity so that terminals may be inserted into the cavities; the shutter plates slidably move a limited amount in the other direction so that the small ends of the keyhole slots straddle the lead wires where they leave the terminals and lock the terminals in the cavities.

3,573,721
ELECTRICAL TERMINAL HAVING CHANNEL-SHAPED CONTACT SECTION
Wladimiro Teagno, and Carlo Masino, Turin, Italy, assignors to AMP Incorporated, Harrisburg, Pa.
Filed Jan. 15, 1969, Ser. No. 791,269
Claims priority, application Italy, Jan. 17, 1968, 7637B/68
Int. Cl. H01r 5/08
U.S. Cl. 339—223 2 Claims



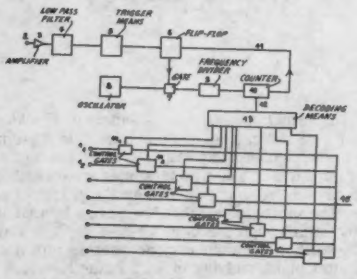
A tube terminal for bus bar application has an oval crimping ferrule for receiving twin wires and a tongue of shallow channel section of width substantially equal to that of the ferrule.

3,573,722
REAR ENTRY CONTACT FOR A LAMP BULB SOCKET
Don L. DeLano, Mt. Clemens, and Joseph W. Horton, Pontiac, Mich., assignors to Microdot Inc., New York, N.Y.
Filed Feb. 26, 1969, Ser. No. 802,405
Int. Cl. H01r 13/06
U.S. Cl. 339—252 7 Claims



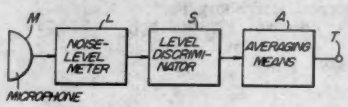
The socket has one or a plurality of spring pressed sleeves for receiving a conducting clip on the end of one or more conductors which is insertable from the rear end to project beyond and lock to the forward end of the sleeve and form a terminal head which engages a contact of a light bulb.

3,573,723
METHOD AND APPARATUS FOR SEISMIC PROSPECTION
Dominique Michon, Paris, France, assignor to Compagnie Generale de Geophysique, Paris, France
Filed Dec. 24, 1968, Ser. No. 786,600
Claims priority, application France, Jan. 12, 1968, 135736
Int. Cl. G01v 1/00
U.S. Cl. 340—15.5 2 Claims



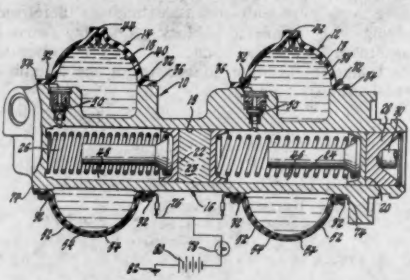
A seismic prospection system of the type resorting to a plurality of geophones or groups of geophones feeding a common recording means to obtain average figures wherein the strays are eliminated by the successive transient disconnections of the different geophones with reference to a common recording means as provided by a detector located ahead of the geophones so that the incoming strays impinging on the detector produce pulses disconnecting the successive geophones during an operative cycle.

3,573,724
TRAFFIC FLOW DETECTING APPARATUS
Katsuhiro Komorida, Yokohama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma-shi, Osaka, Japan
Filed July 10, 1967, Ser. No. 652,158
Claims priority, application Japan, July 15, 1966, Nov. 15, 1966, Dec. 2, 1966, 46723;75661;79471
Int. Cl. G08g 1/09, 1/01
U.S. Cl. 340—38 5 Claims



A traffic flow detecting apparatus in which a noise delivered from a running vehicle is utilized to derive an information for the signal control of an actuation-responsive traffic signal device. The traffic flow detecting apparatus is more economical and practical than the treadle type, inductance loop coil type and radar type.

3,573,725
RESILIENT ACCUMULATOR RESERVOIR WITH FAILURE SWITCH
Ronald L. Shellhause, Vandalia, Ohio, assignor to General Motors Corporation, Detroit, Mich.
Filed June 25, 1969, Ser. No. 836,238
Int. Cl. B60q 1/08
U.S. Cl. 340—60 5 Claims



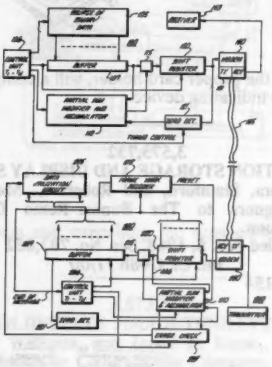
A fluid accumulator reservoir including metallic conductors slidably embedded within the resilient walls defining the reservoir, the conductors being positioned to indicate whether a desired amount of fluid exists in the reservoir. When the reservoir is properly filled the resilient material is expanded sufficiently to separate the conductors opening a signal circuit. Filling of the reservoir and consequent expansion of the resilient walls places them in tension generating a low residual pressure in the fluid system. This pressure acts to provide a constant low-pressure leak test of the system as it will force the fluid outwardly through any leakage passages. Should a loss of fluid occur, the resilient reservoir material contracts engaging the conductors energizing the signal circuit. One form of embodiment includes blade-type conductors engaging both upon the

occurrence of sufficient expansion and contraction of the reservoir completing a circuit indicating overfilled or underfilled conditions.

3,573,726
PARTIAL MODIFICATION AND CHECK SUM ACCUMULATION FOR ERROR DETECTION IN DATA SYSTEMS

Leroy D. Towell, and Harry K. Scott, Dallas, Tex., assignors to Computer Industries, Inc., Los Angeles, Calif.

Filed Sept. 26, 1968, Ser. No. 762,725
Int. Cl. G08c *25/00;* **H04l** *1/10*
U.S. Cl. 340—146.1 **20 Claims**



This invention relates, in general, to error detection for blocks of binary data, and more particularly relates to the transmission of a uniquely modified and check sum accumulated error identifying word, together with detection circuitry at the receiver location which senses the unique word and thereby verifies or negates that a block of data was correctly transmitted and received.

In one preferred embodiment of the invention disclosed herein, a method and apparatus is disclosed for generating at a transmitting station, an error-checking word. The error-checking word is generated by making, in response to random binary bit sequences, unique modifications in its content. For example, one such unique modification in the word's content is made in response to the number of frames in the block of data to be transmitted. Another unique modification of the error word's content is made each time a check sum on a bit-by-bit basis exceeds the modulus, i.e. total bit-plus-bit capacity available in the error word. The error word's content is subject to yet another unique modification, in response to the occurrence of a multibit word, within an overall block of data words, containing all ZERO's.

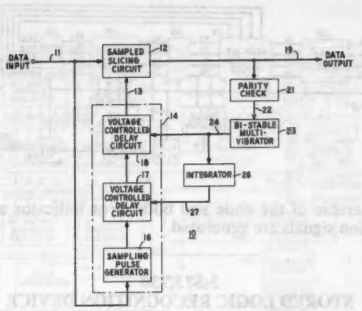
In one particular embodiment the complement of this error word is generated and sent to the receiver as the final word after a data block has been transmitted. Another essentially identical error-check summing circuit at the receiver station accumulates another error word. The receiver error-check word, when summed with the complemented error-check word from the transmitter has a predictable total when all data in the block has been transmitted and received error-free. If a sum other than that predicted is obtained at the receiver, then the received data contained an error.

3,573,727
FEEDBACK ARRANGEMENT FOR MINIMIZING A SYSTEM PARAMETER

Stanley L. Freeny, Middletown, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Nov. 4, 1968, Ser. No. 773,014
Int. Cl. H03k *5/18;* **H04l** *1/10;* **H04b** *3/46*
U.S. Cl. 340—146.1 **6 Claims**

In a feedback circuit, the time at which a slicing circuit samples a received data signal is controlled to minimize the error rate in the digitized output signal. A parity check circuit controls a bistable multivibrator to provide a signal which repetitively varies the sampling time over a narrow

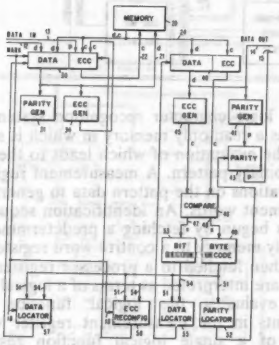


range. The output of the bistable multivibrator is integrated to provide a signal which controls the sampling time over a wider range.

3,573,728
MEMORY WITH ERROR CORRECTION FOR PARTIAL STORE OPERATION

Eugene Kolankowsky, Pleasant Valley, and August K. Pattin, Jr., Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 9, 1969, Ser. No. 790,142
Int. Cl. H04l *1/10;* **H04b** *3/46;* **G08g** *25/00*
U.S. Cl. 340—146.1 **10 Claims**



This invention provides coding circuits for storing words in a memory in an error correction code and for operating with an associated system in which data is provided with error detecting parity check bits. The coding circuits include means for locating an incorrect bit of a memory word and for updating the error correction bits to correspond to the corrected word.

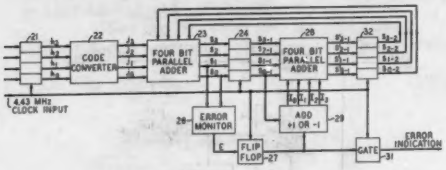
3,573,729
ERROR DETECTION IN MULTILEVEL TRANSMISSION

John F. Gunn, West Newbury, and John A. Lombardi, Haverhill, Mass., assignors to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed May 29, 1969, Ser. No. 829,024
Int. Cl. H04b *1/66;* **G08c** *25/00*
U.S. Cl. 340—146.1 **6 Claims**

Error detection in multilevel partial response correlation code transmission is achieved by maintaining separate

running sums of discrete sets of related pulses. Each sum is monitored for violation of particular constraints



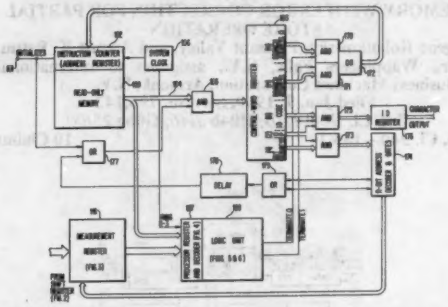
characteristic of the code and both error indicator and sum correction signals are generated.

3,573,730

STORED LOGIC RECOGNITION DEVICE

Douglas R. Andrews, and Allan J. Atrubin, Rochester, Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 15, 1969, Ser. No. 866,654
Int. Cl. G06k *9/06*
U.S. Cl. 340—146.3 **8 Claims**



A stored logic character recognition system is disclosed that includes a read-only memory in which is stored a set of functions, the evaluation of which leads to the classification of a given binary pattern. A measurement register performs logical operations on the pattern data to generate a plurality of measurement words. An identification sequence for each character is begun by fetching a predetermined word from the read-only memory to a control-word register. Succeeding words are then fetched to a processor register and decoder where they are interpreted as terms of a logical function. The processor evaluates the logical function against the measurements in the measurement register with the final evaluation of a single logical function resulting in the selection of one of two branch addresses in the control-word register. By an iterative or multilevel type of operation, measurements of the character image are built up until an identification is achieved.

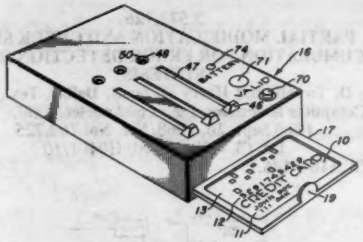
3,573,731

DEVICE FOR DETERMINING AUTHENTICITY OF A CREDIT CARD OR THE LIKE

Fred N. Schwend, Arcadia, Calif., assignor to Clary Corporation, San Gabriel, Calif.

Filed June 17, 1968, Ser. No. 737,488
Int. Cl. G06k *7/00;* **H01h** *43/08, 9/00*
U.S. Cl. 340—149 **8 Claims**

A device for insuring authenticity of a credit card or the like having holes therein representing by their positions and size a particular identification number, such as part of a credit card holder's account number, in which the card differentially sets slides to contact certain of a series of contacts connected in random coded manner to a second series of contacts. The latter contacts are selectively placed in electrical circuit with an authenticity indicating device by means of manually settable slides so that only when the latter slides are properly set in accordance with a coded number



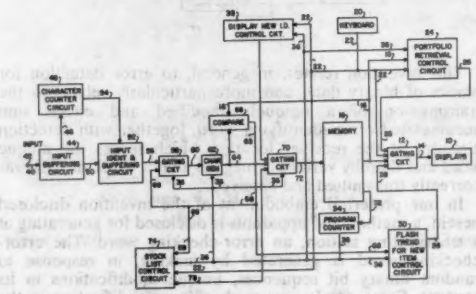
known only to the proper card holder, will a complete circuit be made to the indicating device.

3,573,732

INFORMATION STORAGE AND DISPLAY SYSTEM

Carl Greenblum, Stamford, and Robert L. Metz, Nichols, Conn., assignors to The Bunker-Ramo Corporation, Stamford, Conn.

Filed Feb. 5, 1968, Ser. No. 703,052
Int. Cl. G08b *11/00*
U.S. Cl. 340—154 **74 Claims**



An information storage and display system having a memory element in which items of information to be displayed on a plurality of display devices are stored. The information may be displayed in any one of a plurality of different forms with the information in a given form which is to be displayed on a given display device being stored in an identifiable address position of tee memory element. Information of various types is sequentially applied to the system and is selectively stored, under control of item and form selecting means, in positions of the memory element. Also provided are means for selecting a display form for a given display device and means operable in response to the selecting means for gating information from the appropriate position in the memory element to control the display on a display device.

3,573,733

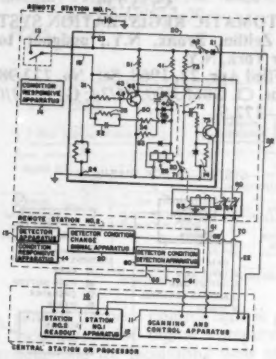
INFORMATION RETRIEVAL SCANNING SYSTEM

Troy L. Pegram, Wabash, Ind., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 23, 1968, Ser. No. 786,346
Int. Cl. H04g *9/00*
U.S. Cl. 340—163R **2 Claims**

An information retrieval scanning system for indicating a change in the position of each of a plurality of remote station switches at a central station wherein upon a change in the position of any one of the remote station switches, a scan command signal from that particular station is provided. Scanning apparatus in the central station seeks out the

station providing the scan command signal to energize apparatus for responding to the position of the switch at the



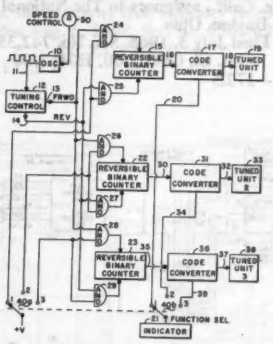
central station and cancelling the scan command signal of that station.

3,573,734

SOLID STATE TOUCH-TUNE SYSTEM

Winston F. Williams, and David F. Keese, Cedar Rapids, Iowa, assignors to Collins Radio Company, Cedar Rapids, Iowa

Filed Apr. 9, 1969, Ser. No. 814,779
Int. Cl. G01r *23/10*; H03b *3/04*; H03k *21/18*
U.S. Cl. 340—168 **10 Claims**



Remote tuning system for a plurality of electronic services employs a common tuning control, function selector, and indicator. Tuning is accomplished by selectively applying pulses of variable repetition rate to electronic counter and code converting means the output of which causes a selected electronic service to be step-tuned at a rate determined by repetition rate of the oscillator.

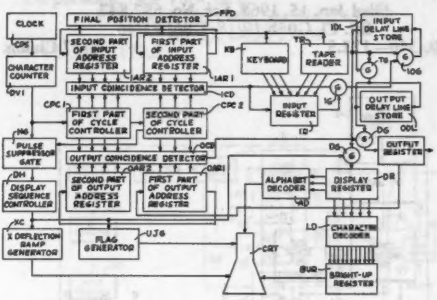
3,573,735

PRODUCTION OF JUSTIFIED CODED TAPE FOR PAGE PRINTING

Gordon A. Clark, Epsom Downs, England, assignor to Purdy & McIntosh (ED) Limited, London, England

Filed June 8, 1967, Ser. No. 644,631
Int. Cl. G11b *27/00*
U.S. Cl. 340—172.5 **4 Claims**

Equipment for editing electrically coded page printing information which accepts an input from a keyboard (or tape reader) and stores coded information in an ultrasonic delay line. While the information is circulating, it is displayed on a Cathode Ray Tube by character generating circuits. The basic information is inserted in front of the displayed information and the whole is transferred to a secondary line



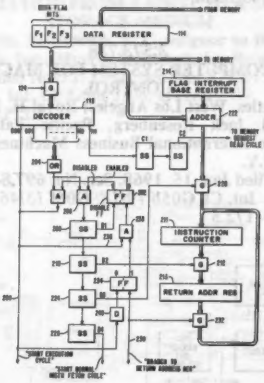
ready to be fed out to a tape punch or type-setting machine. The spacing or justifying information is inserted directly in the second delay line or into the output stage.

3,573,736

INTERRUPTION AND INTERLOCK ARRANGEMENT

Hans P. Schlaeppi, Chappaqua, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1968, Ser. No. 697,766
Int. Cl. G06f *9/18*
U.S. Cl. 340—172.5 **3 Claims**



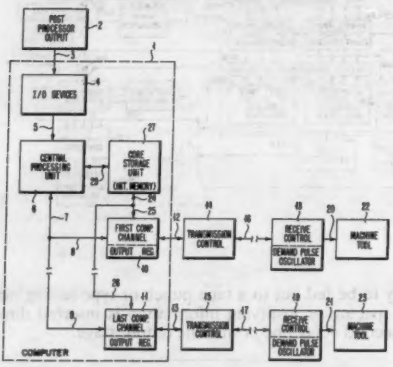
A program control and interlock arrangement is shown wherein a chosen state of a given number of flag bits associated with data words processed by a first program are used to selectively activate one of several other programs whenever the first program encounters a data word in such chosen state, and which also permits in a multiprogrammed and/or multiprocessing system, the locking out of designated data sets from access by a second processor or process while it is still being accessed by a first processor. The signals which control the aforementioned locking out function are provided by the same data flag bits as those that control the activating of the above-mentioned other programs. These same flag bits may be employed to set and reset the interlock signals as appropriate for the lockout function to provide the mutual interlocking required to protect several concurrent processes from operating on the same data set.

3,573,737

REDUCTION OF PROCESSOR LOADING IN A DEMAND COMPUTER SYSTEM FOR MACHINE TOOL CONTROL

Jack Rosenberg, Pacific Palisades, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1968, Ser. No. 697,847
Int. Cl. G05b 19/18; G06f 15/46
U.S. Cl. 340—172.5 7 Claims



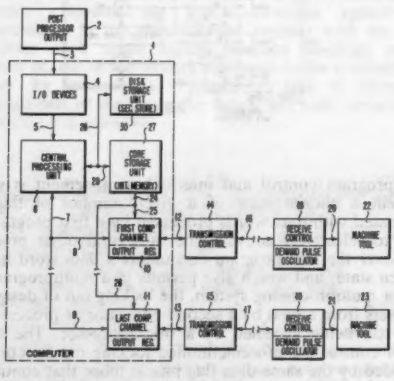
A system for reducing the loading of a processor and amount of core storage required when a processor is used to calculate command words for controlling the slides of a machine tool and a constant frequency oscillator external of the machine tool is used to gate the command words from core storage to the machine tool. The output of the oscillator is applied to a preset counter which has been loaded with a number equal to the reciprocal of the quantity comprising the desired feed rate over the maximum feedrate and ones commanding movement are entered into the bit position associated with the axis to be moved the furthest during the cutting of the segment.

3,573,738

DEMAND COMPUTER SYSTEM FOR MACHINE TOOL CONTROL

David M. Bottles, West Los Angeles; Royal H. Daw, Sherman Oaks, and Jack Rosenberg, Pacific Palisades, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 15, 1968, Ser. No. 697,849
Int. Cl. G05b 19/18; G06f 15/46
U.S. Cl. 340—172.5 9 Claims



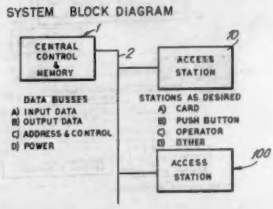
A system for controlling a machine tool or other precise mechanism having a number of slides in which system a sequence of command words for moving each of the slides during the cutting of a segment is calculated and stored in a core storage unit and gated out from core under control of an external demand oscillator to the servosystem of the associated machine tool.

3,573,739

AUTOMATIC REGISTRATION SYSTEM

Richard A. Zeitlin, Bronx, N.Y., assignor to Autolectron Corp., New York, N.Y.

Filed Apr. 22, 1968, Ser. No. 722,980
Int. Cl. G06f 3/00, 15/24; G11b 13/00
U.S. Cl. 340—172.5 11 Claims



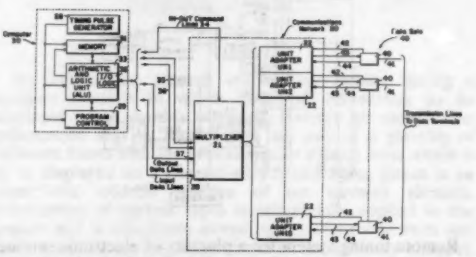
A computer compatible system with apparatus for the automatic registration of status information of persons or articles; the automatic registration and assignment of a portable device to a particular person or place; the registration of ancillary data pertaining to persons or articles; and the retrieval of all such information and data; wherein access to a remote memory device is provided at a plurality of locations, each location independently operable through a time multiplexed scanning system.

3,573,740

COMMUNICATION MULTIPLEXER FOR ON-LINE DATA TRANSMISSION

Melvyn S. Berger, Canoga Park, and Bob J. Baker, Hawthorne, Calif., assignors to The National Cash Register Company, Dayton, Ohio

Filed July 3, 1968, Ser. No. 742,354
Int. Cl. G06f 3/00; H04j 3/00
U.S. Cl. 340—172.5 16 Claims

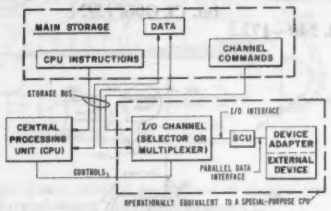


A communications system comprised of a multiplexer and a plurality of unit adapters for transferring data characters between a high speed digital computer and a plurality of relatively low speed data transmission devices operating online with the computer. A scanner circuit included in the multiplexer provides for sequential servicing, in turn, each of the unit adapters for transferring the data characters. The scanner circuit may be interrupted at any time such that the computer can transfer a function selector character to any of the unit adapters, the character determining whether the unit adapter will thereafter operate in an input or output mode. Monitor and control logic in each unit adapter has circuitry therein for detecting an overload condition resulting from online operation of the computer system during an input mode of operation, thereby detecting any loss of data in its real time operation and enabling the computer to monitor the circuits to correct the loss of data caused by the overload condition.

3,573,741
CONTROL UNIT FOR INPUT/OUTPUT DEVICES

Bruce D. Gavril, New York, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed July 11, 1968, Ser. No. 744,075
Int. Cl. G06f *3/00*
U.S. Cl. 340—172.5 13 Claims

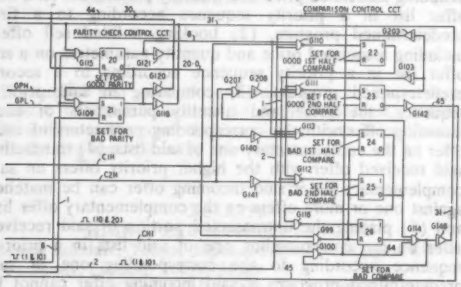


A versatile, general purpose control unit is provided for controlling a wide variety of digital computer peripheral devices and systems and for facilitating their attachment to the complex system I/O interface. Programmable digital interfaces and control circuitry are provided in the control unit for affecting a wide variety of external device operations in addition to conventional data read and data write functions. Means are further provided for directly interconnecting two peripheral devices through the control unit without computer system activity during data transfer; this eliminates unnecessary interference with the system memory or with the I/O channel. An additional aspect allows the attached peripheral equipment to change the effective system address of the control unit in order to more effectively utilize control unit facilities.

3,573,742
DATA REGISTRATION SYSTEM

George Riddell, Lincroft, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Aug. 6, 1968, Ser. No. 750,562
Int. Cl. G06f *3/04*
U.S. Cl. 340—172.5 16 Claims


COMPARISON CONTROL CCT
PARITY CHECK CONTROL CCT
SET FOR GOOD PARITY
SET FOR BAD PARITY
SET FOR GOOD 1ST HALF COMPARE
SET FOR GOOD 2ND HALF COMPARE
SET FOR BAD 1ST HALF COMPARE
SET FOR BAD 2ND HALF COMPARE
SET FOR BAD COMPARE

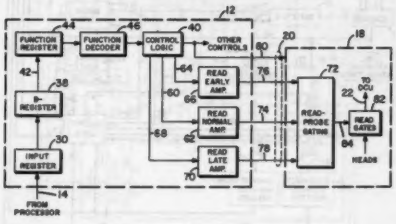
A register translator circuit is disclosed which receives plural order binary data from a time division pulse code modulation system and in response thereto, (1) registers the data in storage flip-flops, (2) checks the data for parity, (3) compares the registered data with that subsequently received on a retransmission of the same information, and (4) if the comparison test passes, translates the registered information into a plurality of 1-out-of-N bits. If either the parity or comparison test fails, the input flip-flops are reset and the above operations are repeated until identical data with good parity is received on two successive transmissions.

Each data word is represented by a timewise staggered sequence of signals not all of which are overlapping. Because all signals representing a word do not overlap, a comparison circuit is provided which is divided into a first and a second half each of which is individual to a corresponding portion of the data word received on successive transmissions.

3,573,743
PROGRAMMABLE TIMING CONTROLS FOR MAGNETIC MEMORIES

Edward P. Hadd; Merlin L. Hanson, St. Paul, and Anthony R. Talarczyk, Bloomington, Minn., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Sept. 30, 1968, Ser. No. 763,643
Int. Cl. G05b *19/00*
U.S. Cl. 340—172.5 15 Claims

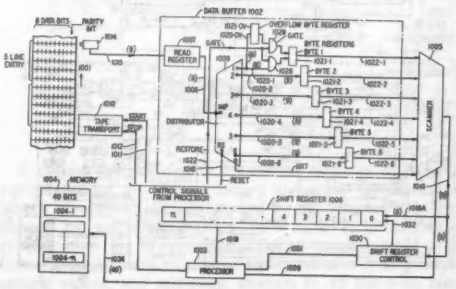


A magnetic memory access control system including programmable read-probe timing control circuitry for programmably changing the time of occurrence of read-probe pulses in response to programmed control instruction is described. The system includes a data processor capable of issuing control instructions for controlling the operation of a magnetic memory device. An access control unit is coupled intermediate to the data processor and the magnetic memory device, and operates to translate the control instructions. One class of control instruction defines the time of occurrence of read-probe pulses, for gating read amplifiers in the magnetic memory device at the programmably selected times.

3,573,744
DATA BUFFER SYSTEM FOR TRANSFERRING INFORMATION FROM A FIRST TO A SECOND STORAGE MEDIUM

Livio A. Rigazio, Eatontown, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Nov. 1, 1968, Ser. No. 772,515
Int. Cl. G06f *3/06*; G11c *19/00*
U.S. Cl. 340—172.5 22 Claims

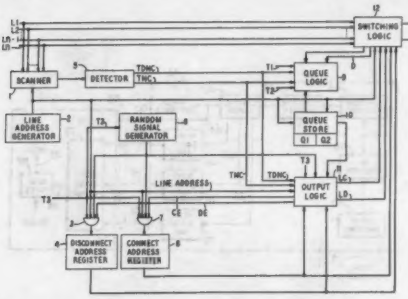


A data buffer and converter is disclosed which receives information from a first storage medium such as a magnetic tape, converts it into a different format, and enters the converted data into a second storage medium, such as the memory of a stored program machine. Each entry on the tape comprises *n*-lines of *m*-bits each. The data read from each line of an entry is transferred to a different one of a plurality of *m*-bit registers. Subsequently, by means of instrumentalities including a shift register, the data from the plurality of *m*-bit registers is rearranged into a single word having *n* x *m*-bits and entered into the second storage medium.

3,573,745
GROUP QUEUING

Carl J. May, Jr., Holmdel, N.J., assignor to Bell Telephone Laboratories Incorporated, Murray Hill, Berkeley Heights, N.J.

Filed Dec. 4, 1968, Ser. No. 781,145
Int. Cl. G06f *7/00*
U.S. Cl. 340—172.5 13 Claims

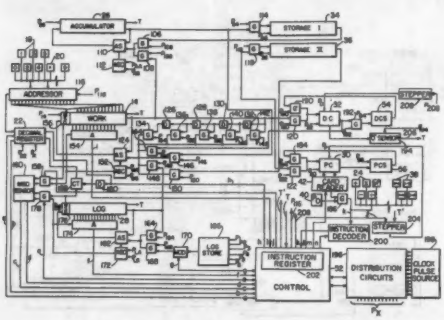


Queuing circuitry that utilizes two variable length queues is disclosed. Input signals exceeding a system's capacity are queued in queue Q1 while inputs in queue Q2 are served by the system. When all of the inputs in queue Q2 have been served, the inputs in queue Q1 are transferred to queue Q2 where they are served while a new queue is formed in queue Q1. The length of the queues vary as a function of the input overload and the maximum length of either queue equals the maximum number of inputs that may be applied to the system.

3,573,746
CALCULATOR SYSTEM

Prentice I. Robinson, Hudson, N.H.; Ned Chang, Belmont, Mass., and An Wang, Lincoln, Mass., assignors to Wang Laboratories, Inc., Tewksbury, Mass.

Continuation-in-part of application Ser. No. 536,416, Mar. 22, 1966, now Patent No. 3,428,950. This application Dec. 9, 1968, Ser. No. 782,021
Int. Cl. G11b *13/00*
U.S. Cl. 340—172.5 20 Claims

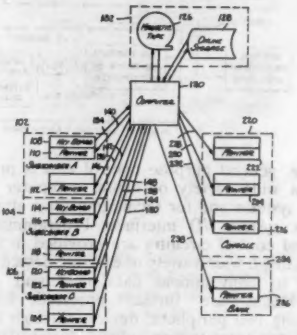


An electronic calculator system includes an arithmetic unit, an input register that receives signals from a keyboard and optionally from one or more card readers for transmission to the arithmetic unit and a memory unit. The card readers are pluggably connected in series and each includes interlock control which cooperates with a program counter to channel instruction and numerical data to the arithmetic unit from the card reader through the input register. The memory unit includes two reversible address counters which in conjunction with a program stored in a card reader enable efficient performance of mathematical manipulations of the matrix type.

3,573,747
INSTINET COMMUNICATION SYSTEM FOR EFFECTUATING THE SALE OR EXCHANGE OF FUNGIBLE PROPERTIES BETWEEN SUBSCRIBERS

Charles W. Adams, Lexington, Mass.; Herbert R. Behrens; Jerome M. Pustilnik, New York, N.Y., and John T. Gilmore, Jr., Acton, Mass., assignors to Institutional Networks Corporation, New York, N.Y.

Filed Feb. 24, 1969, Ser. No. 801,455
Int. Cl. G06f *15/24*
U.S. Cl. 340—172.5 18 Claims



This disclosure is directed to an apparatus and method of automatically, anonymously and equitably buying and selling fungible properties between subscribers. The specific embodiment described in the disclosure relates to the buying and selling of securities wherein a communication system pursuant to this invention is described which permits institutional investors to communicate anonymously with each other for the purpose of arranging block trades of listed and over-the-counter securities. Said system comprises a centralized data storage unit, a digital computer, a plurality of subscriber terminals and a plurality of communication links established therebetween. The method of the system comprises the steps of (1) booking unfilled buy offers including associated price and quantity parameters on a buy offer list in a priority sequence according to a first predetermined program, (2) booking unfilled sell offers including associated price and quantity parameters on a sell offer list in a priority sequence according to a second predetermined program, (3) comparing in said priority sequence, the price and quantity parameters of each incoming offer with the corresponding parameters of each offer on the complementary one of said lists, (4) transacting said received offer with the higher priority offers on said complementary list if said incoming offer can be matched against one or more offers on the complementary offer list, and (5) placing the untransacted portion of said received offer on the corresponding one of said lists in a priority sequence according to the corresponding one of said predetermined programs if said incoming offer cannot be completely matched against offers on complementary offer list.

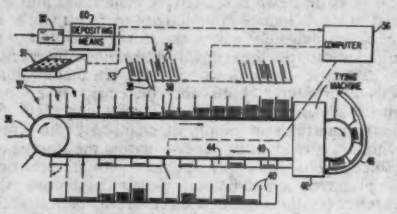
3,573,748
POSTAL SYSTEM

William M. Holme, Falls Church, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

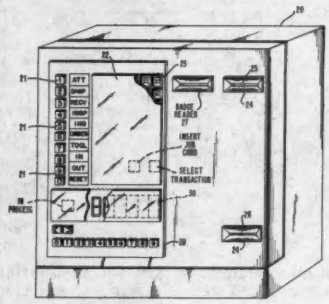
Filed Feb. 24, 1969, Ser. No. 801,685
Int. Cl. G06f *15/46*
U.S. Cl. 340—172.5 3 Claims

A machine for sorting and gathering together articles of like distribution, such as letter mail, which is randomly positioned in a supply source. Each article, being in a respective one of a plurality of categories, is initially sorted by destination or alternatively reclassified to be sorted by dispatch as the machine approaches capacity, so as to

provide continuous sorting. Storage means for tallying inventories, and code generating means are included, as well as dynamic program control and physical means for supply source enrichment, tying, and labeling.



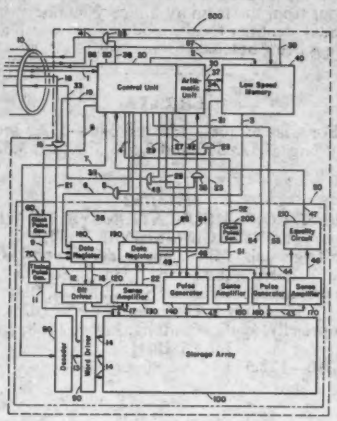
3,573,749
OPERATOR GUIDANCE AND CONTROL TERMIANL
William R. Smith; Carl D. Southard, and Walter D. Van Gieson, Jr., Raleigh, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Mar. 28, 1969, Ser. No. 811,288
Int. Cl. G06f *3/04, 3/14*
U.S. Cl. 340—172.5 **7 Claims**



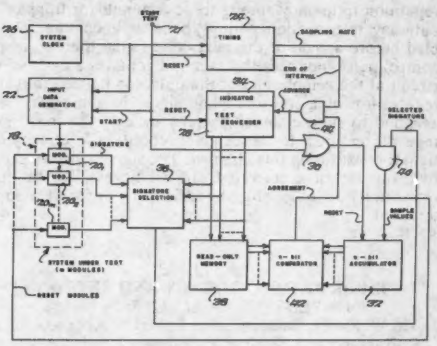
A display and control terminal which in response to operator initiation is utilized to display operator guidance information and control the insertion of data in conformity with the displayed guidance information.

3,573,750
HIGH-SPEED MEMORY SYSTEM
Takashi Ishidate, Tokyo, Japan, assignor to Nippon Electric Company, Limited, Tokyo, Japan
Filed Apr. 1, 1969, Ser. No. 812,067
Claims priority, application Japan, Mar. 29, 1968, Mar. 29, 1968, 20914/1968;20913/1968
Int. Cl. G06f *13/00;* **G11c** *5/02, 7/00*
U.S. Cl. 340—172.5 **18 Claims**

High-speed memory apparatus for use in a data processing system is provided in accordance with the present invention wherein the access experience of the information stored therein may be monitored and the address of the information having the least access experience determined so that new information may be substituted therefor. According to one embodiment of this invention, the high-speed memory apparatus includes a word-organized storage array having at least one monitoring storage element associated with each word therein. Each such monitoring storage element is coupled to means for rendering the magnetic state of said at least one monitoring storage element representative of the access experience of the word associated therewith. Additionally, means are provided for sensing the magnetic condition of each such monitoring storage element. Accordingly, the address of the word having the least access experience may be determined and new word information substituted therefor in the storage array.



3,573,751
FAULT ISOLATION SYSTEM FOR MODULARIZED ELECTRONIC EQUIPMENT
William E. DeLisle, Buffalo, N.Y., assignor to Sylvania Electric Products Inc.
Filed Apr. 22, 1969, Ser. No. 818,218
Int. Cl. G06f *11/02*
U.S. Cl. 340—172.5 **10 Claims**



A system for isolating faulty circuit modules in electronic equipment by the use of binary signature waveforms. All binary waveforms are partitioned into a selected number of classes by sampling each waveform at a predetermined synchronous rate to provide a series of binary sample values, forming *n*-bit binary numbers from successive *n*-bit groups of sample values, and summing, modulo N, all the *n*-bit binary numbers so formed during a predetermined interval, the remainder of said modulo N summation being used as a class identifier. To isolate circuit failures, each module is energized to generate a signature waveform which is analyzed to determine its class identifier. This analyzed class identifier is then compared with the stored class identifier of the correct signature waveform for that module, and a disagreement therebetween indicates a faulty circuit. Apparatus for isolating faults in this manner comprises a memory for storing the predetermined correct signature waveform class identifiers for each of the circuit modules, an *n*-bit accumulator for forming and summing the *n*-bit binary numbers from the signature sample values, a digital comparator for comparing the *n*-bit outputs of the memory

and accumulator, and a test sequencer for selectively connecting a signature waveform from each of the circuit modules to the load input of the accumulator and selectively reading out from the memory a binary number which is the correct class identifier for the module from which a signature waveform is being obtained for analysis.

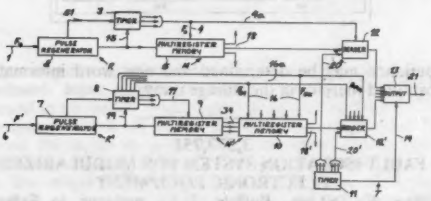
ERRATA

For Classes 308—132 and 340—172.5 see:
Patent Nos. 3,573,510 and 3,573,581 thru 3,573,556

3,573,752
PULSE-CODE-MODULATION SYSTEM WITH CONVERGING SIGNAL PATHS

Evangelo Lyghounis, Milan, and Isidoro Poretti, Castiglione Olona, Italy, assignors to Societa Italiana Telecommunicazioni Siemens S.p.A., Milan, Italy

Filed July 1, 1969, Ser. No. 838,162
Claims priority, application Italy, July 3, 1968, 18,518/68
Int. Cl. H04j *3/12*
U.S. Cl. 340—172.5 **6 Claims**

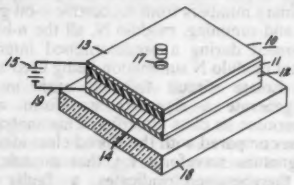


At a point of convergence of several transmission paths, each carrying a multiplicity of channels in the form of interleaved code signals, recurring at different repetition frequencies, selected channels from different incoming paths are sampled at a rate equal to or higher than the highest repetition frequency among these channels for transfer to an outgoing transmission path. Whenever a channel is resampled before arrival of the next code signal thereof, a special control pulse indicates this fact and actuates a discriminating circuit at the remote end of the outgoing path to prevent the registration of a spurious code signal in a memory section assigned to such channel, thereby making the mean rate of registration equal to the original repetition frequency of the signals constituting this channel. The signals so stored can be read out, at an accelerated rate (if necessary), for further retransmission in the aforedescribed way or for decoding at a terminal.

3,573,753
INFORMATION STORAGE AND RETRIEVAL EMPLOYING AN ELECTRON BEAM

David W. Skelly, Ballston Lake; Robert F. Kopczewski; James F. Burgess, and Sterling P. Newberry, Schenectady, N.Y., assignors to General Electric Company

Filed Aug. 1, 1968, Ser. No. 749,457
Int. Cl. G11c *11/34*
U.S. Cl. 340—173 **14 Claims**

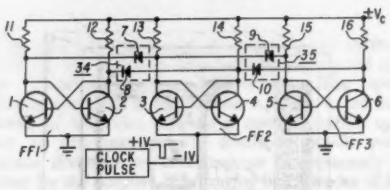


A storage medium is described wherein coded information is destructively written by selectively inducing breakdown in a threshold biased capacitor having an electron sensitive variable conductivity layer positioned therein. In one specific embodiment, a hexachlorobutadiene dielectric layer and a juxtaposed lead oxide semiconductive layer are sandwiched between a tin oxide electrode and an electron transparent aluminum electrode. After threshold biasing the structure in a direction opposing conductivity in the lead oxide layer, a 10 kv. electron beam is selectively penetrated into the layer of lead oxide to induce conductivity therein thereby shifting the biasing voltage division in the storage medium to effect a localized dielectric breakdown in the hexachlorobutadiene. The dielectric breakdown in the hexachlorobutadiene selectively ruptures both the dielectric layer and the aluminum electrode thereover producing 10—50 mil diameter apertures at points of electron beam irradiation. Information is readout by reverse biasing the storage medium and selectively scanning the medium with an electron beam. In a preferred embodiment, a semiconductive wafer is substituted for the tin oxide electrode to permit readout of the recorded information unimpeded by capacitive coupling between the electrodes.

3,573,754
INFORMATION TRANSFER SYSTEM

Jerry D. Merryman, Dallas, Tex., assignor to Texas Instruments, Incorporated, Dallas, Tex.

Filed July 3, 1967, Ser. No. 650,832
Int. Cl. G11c *11/40;* **H03k** *3/286*
U.S. Cl. 340—173 **7 Claims**



An information transfer system for transferring binary information from a first storage unit to a second storage unit in successive steps utilizing an intermediate storage unit and gates differently responsive to various conditions of an energizing source. During one condition of the energizing source, the binary information is transferred from the first storage unit to the intermediate storage unit, gates allowing communication between the first storage unit and the intermediate storage unit while blocking communication between the intermediate storage unit and the second storage unit. During another condition of the energizing source, the binary information is transferred from the intermediate storage unit to the second storage unit, gates allowing communication between the intermediate storage unit and the second storage unit while blocking communication between the intermediate storage unit and the first storage unit. The gates are differently responsive to two predetermined conditions of the energizing source in order to effect the desired communication and transfer of information between the storage units while these gates are non responsive to the energizing source when it is changing between these predetermined conditions so that the desired operation of the system is achieved only during two predetermined conditions of the energizing source.

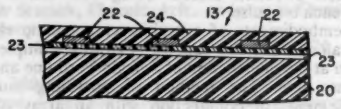
3,573,755
ELECTRICAL TABLET FOR GRAPHIC INPUT SYSTEM

Thomas O. Ellis, Palos Verdes Estates, and Malcolm R. Davis, Woodland Hills, Calif.

Original application June 29, 1964, Ser. No. 378,786, now Patent No. 3,399,401, dated Aug. 27, 1968. Divided and this application Feb. 16, 1968, Ser. No. 724,658
Int. Cl. G08c *21/00*
U.S. Cl. 340—173 **4 Claims**

An electrical tablet is disclosed which includes a wire

screen of parallel wires along X and y coordinates with



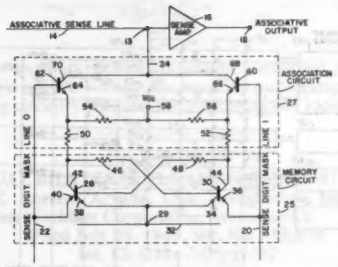
capacitatively coupled energizing conductors which are structurally arranged in accordance with a binary code.

3,573,756

ASSOCIATIVE MEMORY CIRCUITRY

Durrell W. Hillis, and Thomas W. Hart, Jr., Phoenix, Ariz., assignors to Motorola, Inc., Franklin Park, Ill.

Filed May 13, 1968, Ser. No. 728,691
Int. Cl. G11c *11/40, 15/00*
U.S. Cl. 340—173 **8 Claims**



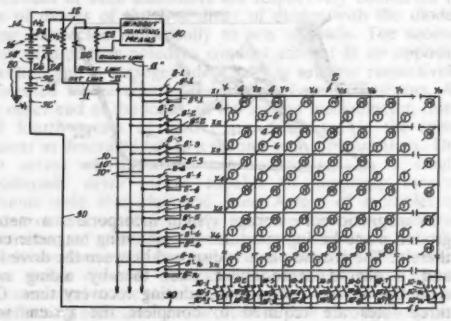
An associative memory cell comprising a memory circuit and an association circuit. The memory circuit includes first and second transistors cross coupled in a bistable circuit configuration so that the first and second transistors alternately conduct as the cell is switched from one to the other of its two stable conductive states. An association current switching circuit is connected between the memory circuit and an associative sense terminal and is further connected to a sense-write circuit. The association circuit is responsive to the conductive state of the memory circuit and to the conductive state of the sense-write circuit to either conduct current from the associative sense terminal or remain nonconductive and thereby indicate association between the sense-write circuit and the memory cell.

3,573,757

MEMORY MATRIX HAVING SERIALLY CONNECTED THRESHOLD AND MEMORY SWITCH DEVICES AT EACH CROSS-OVER POINT

Robert T. Adams, Short Hills, N.J., assignor to Energy Conversion Devices, Inc., Troy, Mich.

Filed Nov. 4, 1968, Ser. No. 773,035
Int. Cl. G11c *11/36;* **H03k** *19/12*
U.S. Cl. 340—173 **4 Claims**



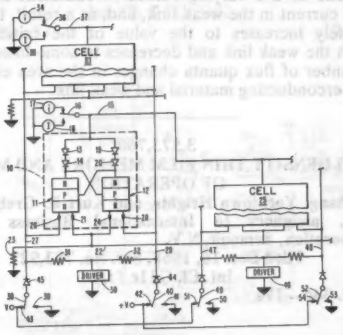
A binary memory circuit used in a memory matrix array of the crossgrid X–Y conductor type. The memory matrix of X and Y axes conductors forming rows and columns of conductors to be addressed, first and second series connected switch devices coupled between each active crossover point of the X and Y conductors, each first switch device being a threshold switch device which has a relatively high resistance condition when the voltage applied thereto is below a first voltage threshold level, and is switched to a relatively low resistance condition when the voltage applied thereto reaches said first voltage threshold level, which low resistance condition remains until the current therethrough drops below a given holding value, and each second switch device being a memory switch device which is triggered into a relatively low resistance condition when the value of the voltage applied thereto exceeds a second voltage threshold level and which condition remains in such low resistance condition independently of the presence of absence of an applied voltage until reset to a high impedance condition with the feeding of a reset current pulse therethrough.

3,573,758

NON-LINEAR IMPEDANCE MEANS FOR TRANSISTORS CONNECTED TO EACH OTHER AND TO A COMMON POWER SOURCE

Robert A. Henle, Hyde Park, and W. David Pricer, Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 27, 1969, Ser. No. 802,927
Int. Cl. G11c *11/40;* **H03k** *3/286*
U.S. Cl. 340—173 **36 Claims**



Each of the pair of transistors of a flip-flop storage cell has its collector connected through a nonlinear impedance means to a low constant current source when the cell is in an inactive condition. The nonlinear impedance means for the conducting transistor maintains the ratio of the load impedance means to the base-emitter impedance of the conducting transistor greater than one to maintain the transistors of the cell in the desired bistable state when the transistors are connected to the low constant current source through the nonlinear impedance means.

3,573,759

MAGNETIC FIELD COUPLED SUPERCONDUCTING QUANTUM INTERFERENCE SYSTEM

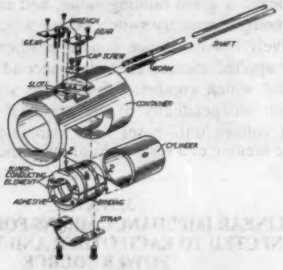
Arnold H. Silver, Farmington, and James E. Zimmerman, Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Continuation of application Ser. No. 537,239, Mar. 24, 1966, now abandoned. This application Jan. 24, 1969, Ser. No. 796,303
Int. Cl. G11c *11/44*
U.S. Cl. 340—173.1 **6 Claims**

This disclosure relates to an electrical circuit component including a superconductive quantum interference device having a loop of superconducting material with a weak link positioned therein. The loop of superconducting material and

the weak link enclose an area for the reception of magnetic flux. Means are positioned adjacent the superconductive quantum interference device for producing a varying magnetic field at the device to induce a current therein. The magnitude of the varying magnetic field is sufficient to induce a critical current in the weak link. As a result, the current induced in the superconductive quantum interference device alternately increases and decreases as the number of flux quanta changes in the area enclosed by the superconducting material and weak link.

The disclosure also relates to a process of inducing a nonlinear electric current in a superconductive quantum



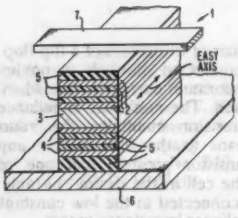
interference device having a loop of superconducting material with a weak link positioned therein. It comprises placing this device in a superconducting state and locating an inductive member magnetically adjacent thereto. A varying current is applied to the inductive device to induce a current in the superconductive quantum interference device. The magnitude of this varying current is sufficient to induce a critical current in the weak link, and, as a result, the current alternately increases to the value of the critical current through the weak link and decreases to some lower value as the number of flux quanta changes in the area enclosed by the superconducting material and weak link.

3,573,760

HIGH DENSITY THIN FILM MEMORY AND METHOD OF OPERATION

Hsu Chang, Yorktown Heights, and Kurt R. Grebe, Beacon, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 16, 1968, Ser. No. 783,927
Int. Cl. G11c *11/14*
U.S. Cl. 340—174 **28 Claims**



A multilayer, multithreshold magnetic film memory element is disclosed which consists of a number of superposed magnetic storage layers which share the same word and bit-sense lines. Operation of the element is essentially in the orthogonal drive mode and requires the application of different amplitude pulses on the word line to separately energize each of the storage films of the memory element. Thus, for readout of stored information, the amplitude of a succeeding read pulse increases relative to the amplitude of the preceding read pulse. Each ascending step in the read pulses provides sufficient magnetic field to overcome the rotational switching threshold of a storage film, but insufficient magnetic field to overcome the rotational switching threshold of the next storage film. For writing, each succeeding pulse after the initial pulse is lower in amplitude than the preceding pulse and is applied in coincidence with one bit pulse. Only one layer at a time is switched; the magnetization direction thereof being determined by the polarity of each bit pulse.

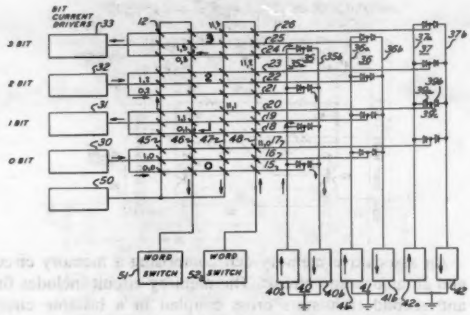
Several embodiments of a multilayer magnetic elements are shown all of which are capable of storing multiple bits of information at the intersection of a single word line and a single bit-sense line. The method of operating multilayer memory elements in conjunction with an array of these elements is also disclosed.

3,573,761

COINCIDENT CURRENT MAGNETIC CORE MEMORY MATRIX

Richard M. Genke, Colts Neck, N.J., assignor to Interdata, Inc., Oceanport, N.J.

Filed Feb. 28, 1968, Ser. No. 709,131
Int. Cl. G11c *5/02, 11/06*
U.S. Cl. 340—174 **16 Claims**



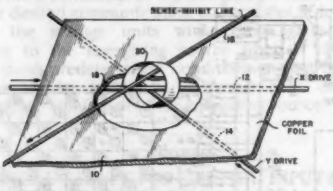
A coincident current magnetic core memory matrix of the 2½ D-type having bit lines arranged in groups and a separate bit current driver is connected to one end of all the bit lines of a group. A plurality of pairs of conductors are provided equal in number with the number of bit lines in a group. Diodes connect another end of each bit line of a group to a differing one of the conductor pairs. There is provided for each pair of conductors bit switching means operable for connecting both conductors of a pair to a point of reference potential to complete a path for flow of bit current through the respective bit lines.

3,573,762

3-WIRE COINCIDENT CURRENT CORE MEMORY

Richard W. Svobodny, Bloom, Minn., assignor to United States of America as represented by the Secretary of the Navy

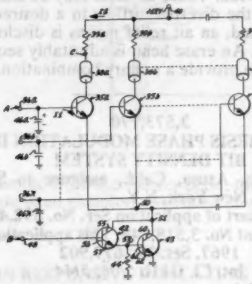
Filed Jan. 28, 1969, Ser. No. 794,514
Int. Cl. G11c *5/04, 7/02, 11/06*
U.S. Cl. 340—174 **3 Claims**



A magnetic core storage system incorporates a metallic ground plane having apertures for mounting magnetic cores therein. The ground plane is disposed between the drive lines and a shared sense-inhibit line, thereby aiding noise reduction in the system and reducing recovery time. Only three lines are required to complete the system while retaining all operative functions.

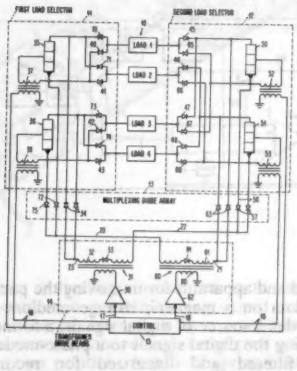
3,573,763
WORD DRIVER FOR A MAGNETIC MEMORY
Bohumir Sramek, Phoeniz, Ariz., assignor to General Electric Company
Filed Feb. 11, 1969, Ser. No. 798,320
Int. Cl. G11c 7/00, 5/02
U.S. Cl. 340—174 4 Claims

A word driver for writing and reading information in a



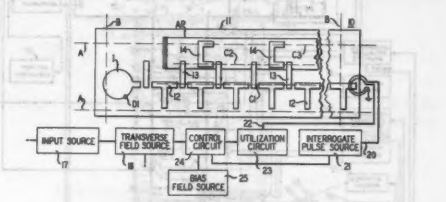
magnetic memory having transistors connected directly to TTL logic circuits without the need for buffer amplifiers and decoding circuitry between the transistors and logic circuits.

3,573,764
DUAL BILATERAL FLOATING GATE SWITCH
Loren E. Larsen, Arvada, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.
Filed July 29, 1969, Ser. No. 845,851
Int. Cl. G11c 7/00, 11/02
U.S. Cl. 340—174 3 Claims



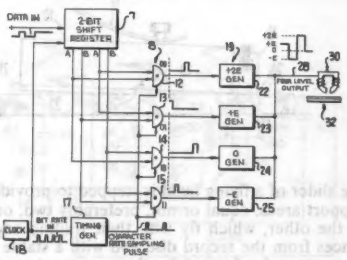
An array of loads selectively receives reversed currents. Transistor load selectors are connected on each end of the loads in the array. First and second arrays of diodes are connected between transistors in one load selector to the loads, groups of such diodes are connected respectively to the transistors in a first load selector. The collector electrodes of such transistors are respectively connected to sets of diodes of the first array of diodes with the diodes being connected individually to sets of loads. The second array of diodes is poled to conduct current in an opposite direction and is arranged identically in sets but respectively connected to the emitter electrodes of such transistors. At the other end of the loads, in the second load selector, third and fourth arrays of diodes are connected in the same manner as described but to a second array of transistors. The two arrays of transistors are multiplexed to a single transformer drive means capable of supplying reverse currents over four electrical lines. Arrays of multiplexing diodes connected respectively to the emitter and collector electrodes of the transistors provide isolation of the transistors. Some isolation is provided within the transformer drive means dynamic electrical impedance. Control means are connected to the transistor arrays and to the drive means for effecting selective reverse current flow through any one of the loads in such array.

3,573,765
DOMAIN PROPAGATION ARRANGEMENT
Anthony J. Perneski, Martinsville, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.
Filed Nov. 1, 1968, Ser. No. 772,667
Int. Cl. G11c 11/14, 19/00
U.S. Cl. 340—174 11 Claims



A read-only domain propagation memory is realized by appliqueing magnetic traps for single wall domains along a propagation channel for such domains. The traps can be defined by a magnetically soft or by a permanent magnet overlay arrangement which extracts a preset pattern of domains from the propagation channel responsive to a control signal. The overlays are removable to permit a change in the domain pattern.

3,573,766
APPARATUS AND PROCESS FOR RECORDING BINARY DATA IN COMPACT FORM
Frank A. Perkins, Jr., Melbourne Village, Fla., assignor to Radiation Incorporated, Melbourne, Fla.
Filed Feb. 17, 1969, Ser. No. 799,865
Int. Cl. G11b 5/02
U.S. Cl. 340—174.1 10 Claims

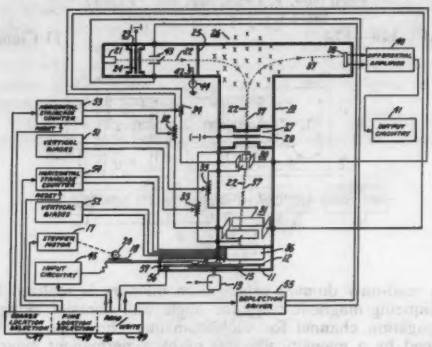


Serial binary data to be recorded is divided into groups of equal numbers of bits in the order in which those bits appear in the original data format, and each group of bits is sampled in sequence to generate a symbol that distinctively represents the specific sequence of bit values in that group or the same sequence of bit values in any other group of bits. Each symbol occupies a time interval substantially equal to that occupied by a single bit in the original data format, so that by recording the symbols in sequence the entire information content of the original binary data is recorded in compact form.

3,573,767
ELECTRON BEAM READOUT OF MAGNETIC STORAGE DISK
Richard O. McCary, and Fred E. Luborsky, Schenectady, N.Y., assignors to General Electric Company
Filed Nov. 27, 1968, Ser. No. 779,401
Int. Cl. G11b 5/32
U.S. Cl. 340—174.1 18 Claims

A rotating disc coated with a thin magnetic film is used in a vacuum system as a high density data storage medium. A group of magnetic recording heads, overlapped in stairstep fashion, are actuator-positioned so that one complete band of tracks may be recorded in a single revolution of the disc.

Interrogation is accomplished by controllably deflecting an electron beam in a radial direction toward any predetermined track. The electron beam is reflected by an



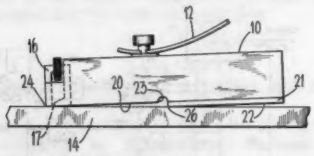
electric potential on the disc surface and deflected by the magnetic field just above the surface. Differential sensing of reflected current allows determination of the stored information.

3,573,768

STEPPED MAGNETIC HEAD WITH OFFSET BIASING

George A. Harris, San Ramon, Calif., assignor to The Singer Company

Filed Oct. 20, 1967, Ser. No. 676,863
Int. Cl. G11b *5/60*
U.S. Cl. 340—174.1 **7 Claims**



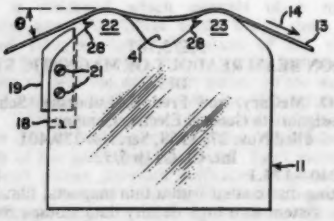
The slider of a flying head is stepped to provide a plurality of support areas, equal or not, preferably two, one upstream from the other, which fly with their trailing edges at equal distances from the record disc and with a stable up-attitude. The step may be formed by the vacuum deposition of, for example, 50 microinches of metal on the upstream support area.

3,573,769

MAGNETIC HEAD WITH AIR RELIEF SLOTS

James D. Flora, East Syracuse, N.Y., assignor to General Electric Company

Filed Oct. 30, 1967, Ser. No. 679,005
Int. Cl. G11b *5/60, 15/64*
U.S. Cl. 340—174.1 **11 Claims**



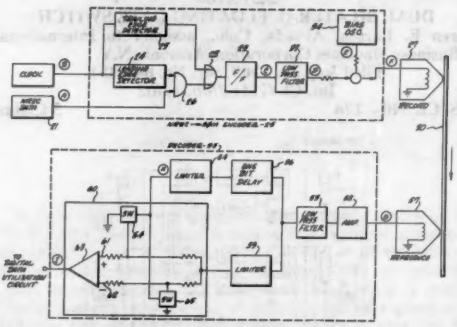
An improved arrangement is disclosed of magnetic heads and tape for writing, reading, and erasing. The arrangement is particularly advantageous for high-speed tape operation, such as for electronic computers, where reliable operation is required and minimum wear is desired in order to achieve long life for the magnetic heads. A particular angle is disclosed for entry of the tape against the head. One or more air diversion means such as lateral slots are provided in the head to divert the airflow which accompanies the moving tape, thus preventing it from tending to lift the tape out of contact with the head. These air slots may be slanted and/or tapered to direct the diverted airflow in a desired direction. For a dual-gap head, an air relief means is disclosed for use between the gaps. An erase head is adjustably secured to the read-write head, to provide a unitary combination.

3,573,770

SIGNAL SYNTHESIS PHASE MODULATION IN A HIGH BIT DENSITY SYSTEM

Kermit A. Norris, Azusa, Calif., assignor to Subscription Television, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 592,458, Nov. 7, 1966, now Patent No. 3,518,648. This application Nov. 1, 1967, Ser. No. 679,902
Int. Cl. G11b *5/06, 5/44*
U.S. Cl. 340—174.1 **18 Claims**



A method and apparatus for improving the packing density of digital data on a magnetic storage medium is disclosed which includes a source of digital signals, a format converter for converting the digital signals to a phase-modulated signal which is filtered and linearized for recording as a nonsaturated analog signal on a magnetic medium. A signal synthesizer included in the record channel, selectively contributes to the phase modulation by predistorting the signal to be recorded in order to compensate for phase distortions in the magnetic storage system. The signal to be recorded is an analog-alternating current signal varying above and below a zero reference line. The synthesizer circuit shifts the phase of the signal to be recorded predetermined amounts and directions such that upon reproduction the zero crossing points are properly separated with a crossing at each bit cell boundary for one binary value and a crossing at each bit cell boundary plus an additional zero crossing at the midbit cell period for the other binary value.

3,573,771

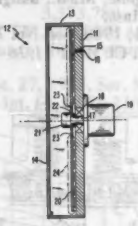
FLEXIBLE DISK MAGNETIC STORAGE DEVICE

Henry H. Cockrell, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 21, 1969, Ser. No. 817,727
Int. Cl. G11b *5/60*
U.S. Cl. 340—174.1 **6 Claims**

A flexible disc magnetic storage device in which the sole

return path for the pumped air is provided through the side



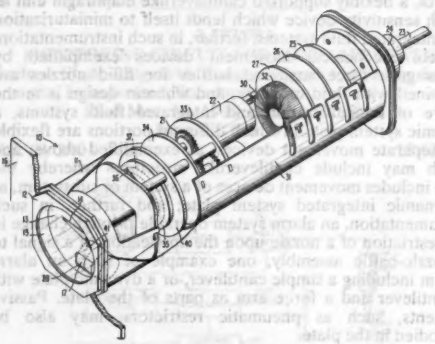
of the disc remote from the backer plate, thus permitting the disc to operate in an enclosed controlled environment.

3,573,772

CONDITION RESPONSIVE INDICATING INSTRUMENT

Richard E. Anderson, Lynn, Mass., assignor to General Electric Company

Filed July 5, 1968, Ser. No. 742,631
Int. Cl. G09f *9/00*
U.S. Cl. 340—187 **5 Claims**



A condition indicating instrument with an extreme condition recorder. A rotatable, magnetized rotor with a pointer affixed thereto is engaged by a condition indicating drive mechanism to be rotated from an original position to an extreme condition position. A pair of spring-biased pivoted members normally act as brakes on the rotor. An electromagnet is energized to release the braking force and produce, in conjunction with the pivoted members, magnetic poles which react with magnetic poles on the rotor to return the rotor toward its original position.

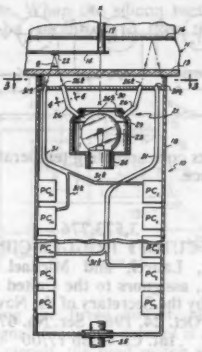
3,573,773

READOUT DEVICE

Edward W. O'Hanlon, Somerville, N.J., assignor to Applied Electronics Corporation of New Jersey, Edison, N.J.

Filed Dec. 26, 1967, Ser. No. 693,684
Int. Cl. G08c *9/06*
U.S. Cl. 340—188 **19 Claims**

In a device for reading the position of a meter pointer or other indicator having a reflective portion and moving in a predetermined path, light is directed at such path from one side, for example, through the meter's cover glass, for reflection back through the glass at the position of the pointer, a series of light receiving elements of light transmitting fibers have ends thereof arranged sequentially along the path to selectively receive the light reflected at the position of the pointer and to selectively illuminate photocells to which the other ends of such elements extend, and an electrical characteristic, such as the frequency, of a signal adapted for transmission to a remote station is determined in dependence upon the selective illumination of



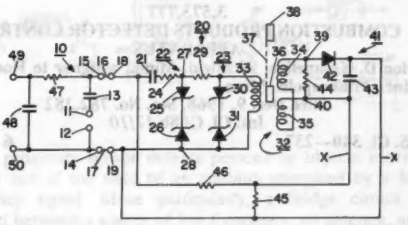
the photocells and hence according to the position of the pointer.

3,573,774

TWO-WIRE TRANSMISSION SYSTEM FOR REMOTE INDICATION

Everett O. Olsen, Wrentham, Mass., assignor to The Foxboro Company, Foxboro, Mass.

Filed May 8, 1967, Ser. No. 636,882
Int. Cl. G08c *19/08*
U.S. Cl. 340—199 **4 Claims**



For the purpose of sensing the condition of remote apparatus, AC energizing power is sent from a local position along a two-wire transmission line to a remote transformer whose coupling between input and output is affected by the condition of the remote apparatus; the transformer output is converted to DC having a level indicating the condition of the remote apparatus, and this DC signal is sent back along the same two-wire transmission line to the local position; bipolar clipping of the AC energizing power at the input of the transformer makes the entire system relatively insensitive to system variables affecting the AC energizing power.

3,573,775

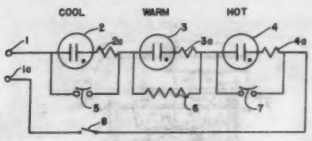
TEMPERATURE INDICATOR CIRCUITS

Victor H. Zane, Connersville, Ind., assignor to Design and Manufacturing Corporation

Filed June 30, 1969, Ser. No. 837,482
Int. Cl. G01l *19/12*
U.S. Cl. 340—227 **13 Claims**

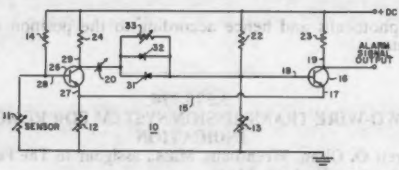
Multistep temperature indicator circuits for electrical appliances and the like comprising electrically actuated indicator means in series circuit with a source of electrical

energy. Each of the indicator means in series corresponds to a temperature range within the appliance and will give an



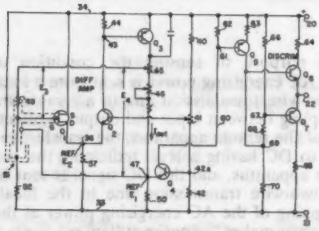
indication when its corresponding temperature range obtains within the appliance.

3,573,776
BIAS CUTOFF TRIGGER CIRCUIT
Donald N. Dick, Laurel, and Michael J. Superczynski, Annapolis, Md., assignors to the United States of America as represented by the Secretary of the Navy
Filed Oct. 24, 1967, Ser. No. 677,797
Int. Cl. G08b *17/00*
U.S. Cl. 340—228 **10 Claims**



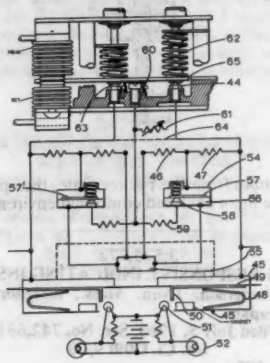
A solid-state high temperature alarm system utilizing an off-on-off oscillator with direct current bias cutoff for use as a temperature monitor in an alarm system.

3,573,777
COMBUSTION PRODUCTS DETECTOR CONTROL APPARATUS
Arlon D. Kompelien, Richfield, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Filed Dec. 9, 1968, Ser. No. 782,382
Int. Cl. G08b *17/10*
U.S. Cl. 340—237 **6 Claims**



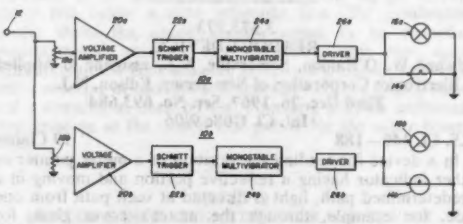
A combustion products detector system having a central station and one or more remote ionization type sensing stations interconnected to the central station by a three conductor line and further having a solid-state end-of-line supervision circuit which reports back on one line that all three lines are in good condition. The remote station has an ionization detector across which is maintained a substantially constant voltage and through which a current flows, the current being reduced in the presence of combustion products. The circuit is specially designed to provide an output current which changes in direct proportion to the sensor current.

3,573,778
CANTILEVER-LIKE DEVICE IN FLUID-MECHANICAL ALARM
Philip H. Sanford, Walpole, Mass., assignor to The Foxboro Company, Foxboro, Mass.
Filed Nov. 1, 1968, Ser. No. 772,595
Int. Cl. H01r *11/26*
U.S. Cl. 340—240 **6 Claims**



In fluid operated instrumentation of process and/or energy control, a flexibly supported cantileverlike diaphragm unit as a high sensitivity device which lends itself to miniaturization and integrated fluid systems; further, in such instrumentation, wherein mechanical movement devices exemplified by diaphragms, force-bars, and baffles for fluid nozzles are combined with fluid circuitry, and wherein design is in the nature of miniaturization and integrated fluid systems, a dynamic system plate in which different portions are flexible and separate movement devices, as exemplified above, and which may include cantileverlike structures whereby the plate includes movement devices of a system or subsystem, as a dynamic integrated system plate; and further, in such instrumentation, an alarm system operable through change in the restriction of a nozzle upon the application of a signal to a nozzle-baffle assembly, one example of such an alarm system including a simple cantilever, or a dynamic plate with a cantilever and a force arm as parts of the plate. Passive elements, such as pneumatic restrictors, may also be embodied in the plate.

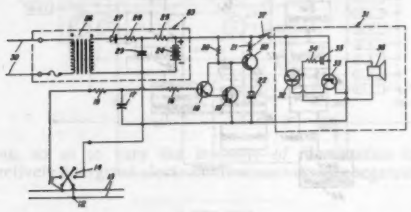
3,573,779
RECORD-LEVEL INDICATOR
Oliver H. McDaniel, Spruce Creek, and James H. Prout, State College, Pa., assignors to the United States of America as represented by the Secretary of theNavy
Filed Mar. 19, 1968, Ser. No. 714,248
Int. Cl. G08b *21/00*
U.S. Cl. 340—248 **5 Claims**



A device for monitoring input levels to a tape recorder having two channels fed by a common input. At a preset peak input level in each channel, an indicator light is triggered. The triggering is accomplished by direct-coupling a voltage amplifier to a Schmitt trigger. When recording, at the proper input level, one channel is adjusted so that its

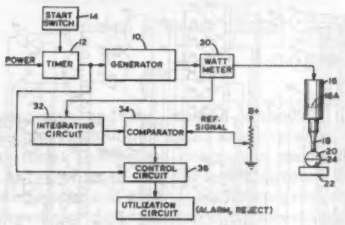
indicator is displaying while the other channel is adjusted so its indicator is not displaying.

3,573,780
AUTOMATIC TELEPHONE ALARM SYSTEM
Franklin C. Butterbaugh, 409 Newburg Ave., Baltimore, Md. 21228
Filed Sept. 27, 1968, Ser. No. 763,092
Int. Cl. G08b *21/00*
U.S. Cl. 340—248 **4 Claims**



An alarm actuating circuit is disclosed for monitoring the condition of a communication line. As long as a line potential exists, an amplifier is cut off. In the case of a short circuit, open fault on the line or grounding of the battery side of the input to the communication line, the cut off no longer exists and the amplifier closes a relay to sound an alarm. The line current required is so small as to be negligible.

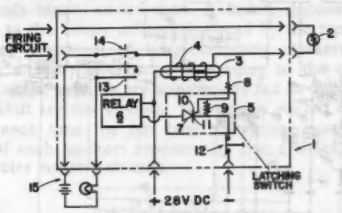
3,573,781
MONITORING CIRCUIT FOR SONIC APPARATUS
Andrew Shoh, Ridgefield, Conn., assignor to Branson Instruments, Incorporated, Stamford, Conn.
Filed Mar. 14, 1968, Ser. No. 713,014
Int. Cl. G08b *21/00*
U.S. Cl. 340—248 **15 Claims**



A sonic or ultrasonic apparatus, actuated for a predetermined time interval, is provided with a control circuit for producing a signal if the energy delivered during such interval is either of too low a value or exceeds a permissible high value. Both the low limit and the high limit are adjustable.

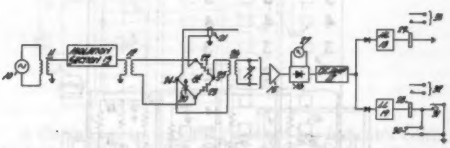
3,573,782
CURRENT MONITOR
John E. Williams, San Jose, Calif., assignor to United Aircraft Corporation, East Hartford, Conn.
Filed May 23, 1968, Ser. No. 731,588
Int. Cl. G08b *21/00*
U.S. Cl. 340—253 **6 Claims**

A current monitor is provided for indicating the presence of the short duration current pulses necessary to detonate ordnance devices and simultaneously interrupt the ordnance firing circuit to simulate firing conditions. The current monitor consists of a reed switch magnetically linked to the firing circuit by a low resistance coil in series with the firing circuit. The normally opened reed switch is connected in series with the monitor power source and the control gate of a silicon controlled rectifier. The monitor source of power is also connected in series with a relay and the anode of the silicon controlled rectifier, the relay being adapted, upon activation, to both interrupt the firing circuit and to generate an instrumentation signal indicative of the presence of the required current flow in the firing circuit. In operation a current pulse sufficient to detonate the ordnance device will cause the reed switch to close and trigger the silicon controlled rectifier. When the silicon rectifier is triggered, the current will be permitted to flow through the relay



thereby interrupting the firing circuit and producing the instrumentation signal. Since the current is no longer flowing through the firing circuit, the reed switch will open, but this will not interrupt the flow of current through the relay since the silicon controlled rectifier will continue to conduct once it has been triggered. Thus, the relay remains activated and the instrumentation signal is maintained until the circuit is reset.

3,573,783
PROXIMITY SENSOR
Solly L. Fudaley, Palos Park, Ill., assignor to R-F Controls, Inc., Chicago, Ill.
Filed Sept. 13, 1967, Ser. No. 667,600
Int. Cl. G08b *13/26*
U.S. Cl. 340—258 **12 Claims**

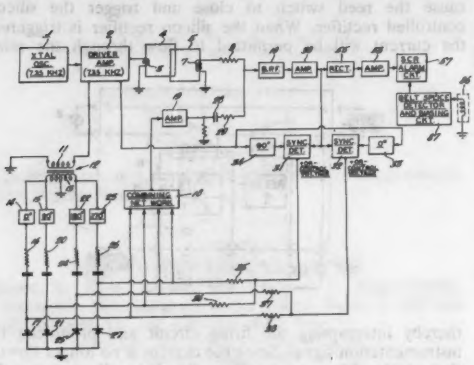


The proximity sensor detects persons or objects moving into or out of the field of an antenna energized by a low frequency signal. More particularly, a bridge circuit is coupled between a source of low frequency, an antenna, and a detector. The bridge is balanced to divide the energy from the source between the antenna and the detector. A switch is connected to cause a control function responsive to the detection of unbalances which occur in the bridge when the field of the antenna is upset. By changing the efficiency of the bridge, the depth of the antenna field may be varied without affecting the operating threshold of the detector.

3,573,784
METAL DETECTING APPARATUS FOR CONVEYOR BELT
Henry L. Bachofer, Newtown Square, Pa. (Sun Oil Company, Bishop Hollow Road, Newtown Square, Pa. 19073), and Elbert N. Shawhan, West Chester, Pa. (Sun Oil Company, Bishop Hollow Raod, Newtown Square, Pa. 19073)
Filed Oct. 2, 1968, Ser. No. 764,549
Int. Cl. G08b *21/00*; **G01r** *33/12*
U.S. Cl. 340—258 **15 Claims**

For detecting metal traveling along a conveyor belt, an excitation coil and a pair of pickup coils are positioned adjacent the belt. A signal voltage is induced in the pickup coils whenever a metallic body passes by such coils. Direct pickup from the excitation coil by the pickup coils is reduced to a minimum by means of a bucking voltage which is

automatically adjusted in phase and amplitude. A separate detecting means automatically reduces the sensitivity of the



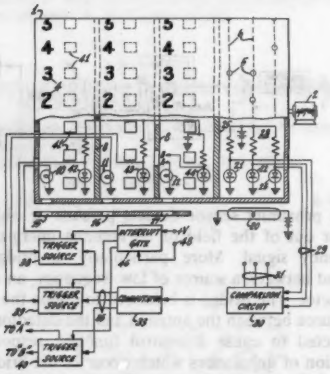
indicating means whenever a metallic nonuniformity in the belt itself passes by the pickup coils.

3,573,785

STROBOSCOPIC DISPLAY APPARATUS

James C. Miller, Pennington, and Charles M. Wine, Princeton, N.J., assignors to RCA Corporation

Filed Oct. 23, 1967, Ser. No. 677,322
Int. Cl. H04l *17/24;* **H01j** *37/24*
U.S. Cl. 340—324 **9 Claims**



A stroboscopic display system having a continuously driven display medium with means to initially enable a momentary illuminating means to display selected characters, and an independent secondary means to automatically enable the illuminating means to display the selected characters after this initial operation until selectively interrupted.

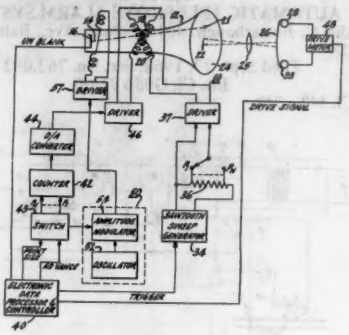
3,573,786

COMPENSATION CIRCUIT FOR ELECTRONIC PHOTOCOMPOSITION SYSTEM

John C. Schira, Princeton, N.J., assignor to RCA Corporation

Filed Oct. 23, 1967, Ser. No. 677,324
Claims priority, application Great Britain, June 12, 1967, 27093/67
Int. Cl. G06f *3/14*
U.S. Cl. 340—324 **7 Claims**

An electronic photocomposition system compensates for variations in the density of characters when the point sizes of the characters are changed. This is accomplished by causing the scanning beam that forms the individual character slices



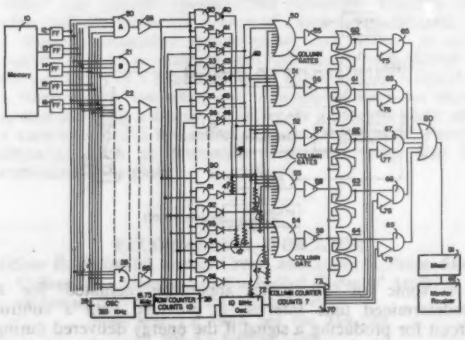
to also fill in the interstitial spaces between adjacent scanlines as the characters are enlarged.

3,573,787

GENERATOR FOR VIDEO SIGNAL FOR REPRODUCTION OF CHARACTERS BY TELEVISION RECEIVER

George E. Sandgren, Glenview, and William Milleker, Chicago, Ill., assignors to Motorola, Inc., Franklin Park, Ill.

Filed Jan. 31, 1968, Ser. No. 701,940
Int. Cl. G06f *3/14;* **G06k** *15/18;* **G08c** *19/28*
U.S. Cl. 340—324 **10 Claims**



Character generator for developing a video signal for application to a television receiver to reproduce characters on the tube screen by a dot matrix. The signal representing each character actuates a plurality of gates for horizontal lines which are operated in turn, and each selectively triggers a set of gates associated with the dot positions along the lines which are operated in turn to produce video components which are combined to form the video signal.

3,573,788

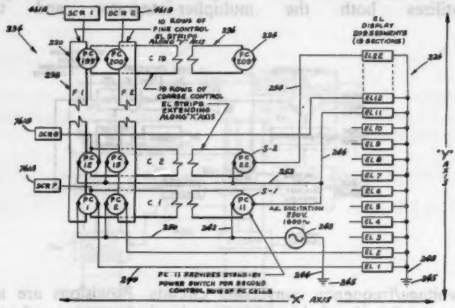
MEANS TO VARY THE INTENSITY OF ILLUMINATION OF ELECTROLUMINESCENT DISPLAY SEGMENTS

Robert J. Molnar, New York, N.Y., and Walter Parfomak, Wallington, N.J., assignors to The Bendix Corporation

Original application Mar. 21, 1966, Ser. No. 535,745, now Patent No. 3,440,637, dated Apr. 22, 1969. Divided and this application Sept. 9, 1968, Ser. No. 758,378
Int. Cl. G01d *7/00;* **G09b** *9/32*
U.S. Cl. 340—324 **5 Claims**

Means for controlling an alternating current selectively

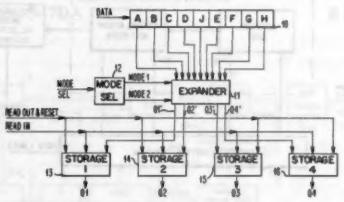
applied to energize a plurality of electroluminescent segments so as to vary the intensity of illumination of the selectively energized electroluminescent display segments.



3,573,789
METHOD AND APPARATUS FOR INCREASING IMAGE RESOLUTION

John V. Sharp, West Hurley, and Donald R. Thompson, Woodstock, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 13, 1968, Ser. No. 783,685
Int. Cl. G06f *3/14*
U.S. Cl. 340—324 **10 Claims**

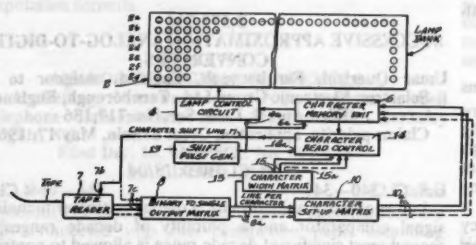


An apparatus and the method embodied therein for increasing the resolution of a data image received and stored in binary form. The method interrogates each data bit with respect to two or more data bits which surround the data bit being interrogated and expands the interrogated data bit into a plurality of new data bits. The apparatus comprises a first storage means, an expander, and a second storage means for storing the newly generated information.

3,573,790
SOLID STATE SIGN SYSTEM

Edward J. Schulenburg, Sr., Danville, Ill., and Ervin M. Ball, Indianapolis, Ind., assignors to Time-O-Matic, Inc., Danville, Ill.

Filed Mar. 2, 1965, Ser. No. 436,469
Int. Cl. G09f *13/00*
U.S. Cl. 340—334 **10 Claims**

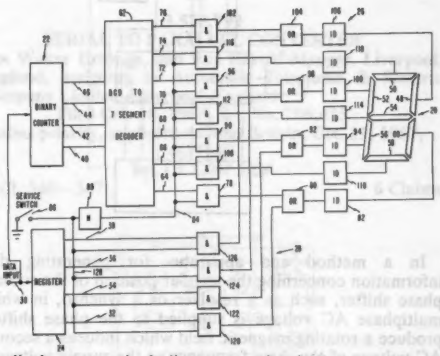


A solid state circuit controlled variable width character running sign lamp bank including a shift register circuit for each row of lamps in which shift register circuit a pattern of lamp-energizing markers are shifted in accordance with the running sign involved. The lamp energizing markers are fed to the first stages of the row shift register circuits from character memory circuits each constituting a shift register circuit with a number of stages equal to the number of lamps in a row required to display the widest character. The sign information is fed to the control circuit from a tape reader which reads binary coded tape. A binary decoder circuit responds to the binary information read by the tape reader and stores a pattern of lamp-energizing markers in the character memory circuits corresponding to the character involved which markers are sequentially fed to the inputs of the row shift register circuits. The tape is shifted one code position each time the last lamp energizing marker of a pattern of such markers representing one character leaves the character memory circuits.

3,573,791
MILTIPLE USE INDICATOR

Karl O. H. Hesse, Arlington, Va., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 7, 1969, Ser. No. 789,568
Int. Cl. G08b *5/36*
U.S. Cl. 340—339 **7 Claims**

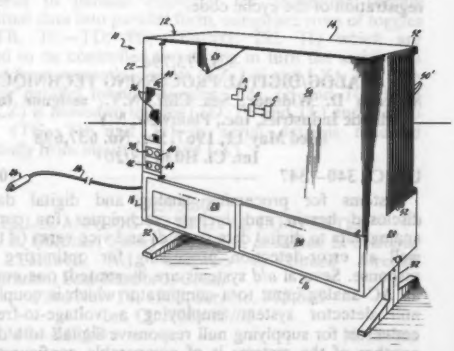


A display system including a seven-bar indicator controlled by logic circuitry to selectively display in binary form coded input characters or to display the number of input characters entered into a register.

3,573,792
UNIVERSAL DISPLAY PANEL

Donald E. Reed, Winter Park, Fla., assignor to the United States of America as represented by the Secretary of the Navy

Filed Nov. 12, 1968, Ser. No. 775,082
Int. Cl. G09f *13/04*
U.S. Cl. 340—339 **12 Claims**



A programmable, lighted display panel device is disclosed comprising a translucent panel, individual areas of which can

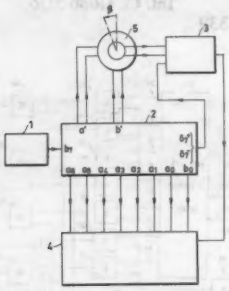
be back-lighted according to programmed circuitry including stepping switch means responsive alternatively to pushbutton selection switch means or single step switch means to control illumination of the pushbuttons and to control a program switch which, together with a wiring patch board, effect energization of predetermined groups of panel illuminating lamps. The circuitry includes means for regulating lamp brightness, for preventing lamp flicker during stepping, and for preventing undue inrush current through lamp-controlling contacts.

3,573,793

SHAFT ENCODER EMPLOYING PHASE SHIFTER DEVICE

Gunnar Axel Kihlberg, Ekorrvagen, Sollentuna, and Bo Hogstrom, Danderyd, Sweden, assignors to Jungner Instrument Aktiebolag, Stockholm, Sweden

Filed Dec. 5, 1966, Ser. No. 599,094
Claims priority, application Sweden, Dec. 9, 1965, 15,971/1965
Int. Cl. H03k *13/20*
U.S. Cl. 340—347 **5 Claims**



In a method and apparatus for generating digital information concerning the angular position of the rotor of a phase shifter, such as a resolver or a synchro, in which a multiphase AC voltage is supplied to the phase shifter to produce a rotating magnetic field which induces a secondary AC voltage of the same frequency as the supply voltage at a phase angle proportional to the angular position of the rotor, the simultaneous readout of a large number of phase shifters can be obtained by frequency dividing a control AC voltage of a predetermined frequency to form a plurality of AC voltages, forming the multiphase AC voltage and a code which varies cyclically with the same frequency as the multiphase AC voltage from the plurality of AC voltages, whereby the position of the vector of the rotating magnetic field derived from the multiphase AC voltage corresponds to a given value of the code at any given moment; and forming readout pulse at substantially given moment; and forming readout pulse at substantially the zero transition of the secondary voltage to thereby produce a readout or registration of the cyclic code.

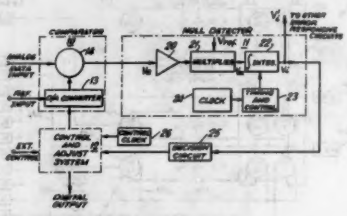
3,573,794

ANALOG/DIGITAL PROCESSING TECHNIQUES

Malcolm D. Widenor, Sea Cliff, N.Y., assignor to North Atlantic Industries, Inc., Plainview, N.Y.

Filed May 11, 1967, Ser. No. 637,698
Int. Cl. H03k *13/20*
U.S. Cl. 340—347 **10 Claims**

Systems for processing analog and digital data are disclosed herein and include techniques for converting analog data to digital data (*a* to *d*) and vice versa (*d* to *a*), as well as error-detection processing for optimizing system response. Several *a/d* systems are illustrated, one employing an AC analog input to a comparator which is coupled to a null detector system employing a voltage-to-frequency converter for supplying null responsive signals to a digitizer; another of the systems is of comparable configuration but employs a multiplier-integrator combination in the null detector system without utilizing voltage-to-frequency conversion. A third system of generally similar configuration utilizes both the multiplier-integrator and the



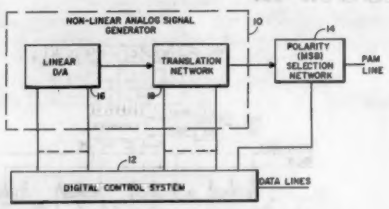
voltage/frequency conversion circuits. Provisions are also made for threshold control and other response shaping functions.

3,573,795

SYSTEMS FOR CONVERTING INFORMATION FROM DIGITAL-TO-ANALOG FORM AND VICE VERSA

John O. Bowers, Jr., and Larry Nordstrom, Seminole, Fla., assignors to General Dynamics Corporation

Filed Mar. 6, 1968, Ser. No. 710,798
Int. Cl. H03k *13/04, 13/17*
U.S. Cl. 340—347 **6 Claims**



High speed systems for nonlinear digital-to-analog and analog-to-digital conversion. The systems include a nonlinear analog signal generator which generates analog signals having amplitudes determined by the lower order bits of a digital code and which translates this analog voltage into an output analog voltage which is nonlinearly related to the code and a translation network including a multiplier which multiplies the first mentioned analog voltage by a factor related to the value of the higher order bits of the digital code. Effectively, this changes the slope of linearly variable analog signals generated in response to the lower order bits of the code. For digital-to-analog conversion, a digital control system responsive to the bits of a digital code operates the nonlinear signal generator to provide an analog voltage corresponding to the value of the digital code. For analog-to-digital conversion, a comparator responsive to the output analog voltage from the generator changes the code presented by the digital control systems and by successive approximations obtains the code which corresponds to the value of an input analog system.

3,573,796

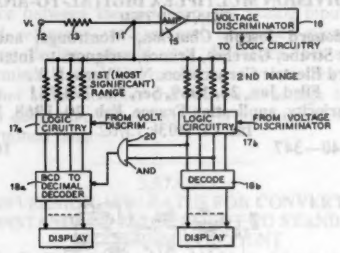
SUCCESSIVE APPROXIMATION ANALOG-TO-DIGITAL CONVERTERS

Umar Querishi, Farnborough, England, assignor to The Solartron Electronic Group Ltd., Farnborough, England

Filed Apr. 5, 1968, Ser. No. 719,136
Claims priority, application Great Britain, May 17, 1967, 22890/67
Int. Cl. H03k *13/04*
U.S. Cl. 340—347 **4 Claims**

In a successive approximation digital voltmeter including a signal comparator and a plurality of decade ranges, the second most significant decade range is allowed to contribute more than 9 of its digits to the comparison signal which is compared by the comparator against an input signal under

measurement. The excess contribution made available by this range is utilized to compensate for voltage overshoots in the

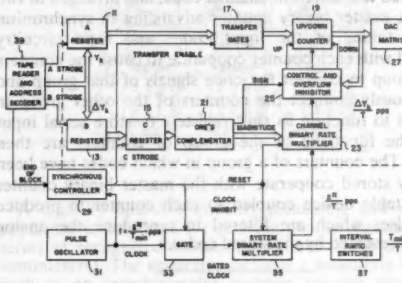


comparator output signal which may result when a relativity large valued signal is applied to the comparator by the most significant decade range.

3,573,797
RATE AUGMENTED DIGITAL-TO-ANALOG CONVERTER

Sheldon Kopelson, Newport News, Va., assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Oct. 24, 1968, Ser. No. 770,209
Int. Cl. H03k *13/02*
U.S. Cl. 340—347DA **8 Claims**



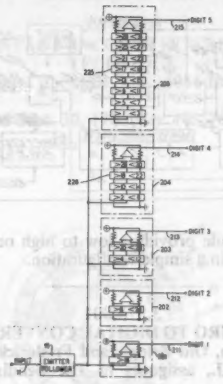
This disclosure describes a rate augmented digital-to-analog converter for computed time-dependent data. The converter produces a smooth continuous function by digitally incrementing functions samples at a rate proportion to a predicted functional change over each sample interval. The result is continuously converted to an analog voltage. The conversion produces an output which is, in effect, the sum of a linear ramp and the function sample. The converter input data are the computed sample and the change which is predicted by the solution of an *n*th-order extrapolation formula. The computer providing the function change information to the converter also solves the *n*th-order extrapolation formula.

3,573,798
ANALOG-TO-DIGITAL CONVERTER

Paul A. Reiling, New Providence, N.J., assignor to Bell Telephone Laboratories, Inc., Murray Hill, Berkeley Heights, N.J.

Filed Dec. 18, 1967, Ser. No. 691,475
Int. Cl. H03k *13/17*
U.S. Cl. 340—347 **12 Claims**

A plurality of parallel transistor-resistor combinations are serially connected into two conduction paths extending between a constant current source and ground. When an analog input signal is applied in common to the base terminals of the transistors, a certain number of the resistances connected in parallel therewith are short-circuited, and difference circuit bridged across the

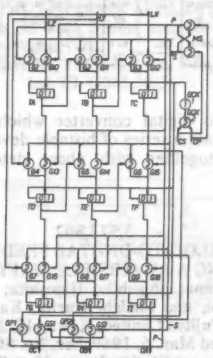


conduction paths yields an output representative of a binary digit.

3,573,799
SERIAL TO PARALLEL CONVERTER

James Walter Drinnan, and Roy Harold Mauger, Liverpool, England, assignors to Automatic Telephone & Electric Company Limited, Liverpool, England

Filed Oct. 10, 1968, Ser. No. 766,415
Claims priority, application Great Britain, Oct. 11, 1967, 46371/67
Int. Cl. G06f *5/04*
U.S. Cl. 340—347 **6 Claims**



A serial to parallel converter for converting serially transmitted data into parallel form, comprises rows of toggles (TA, TB, TC—TD, TE, TF—TG, TH, TI) which are arranged to be controlled for storing in turn the serial data received from respective inputs (LZ, LY and LX). The data stored in parallel form in toggles (TA, TB and TC) from input (LZ) is moved to toggles (TD, TE and TF) and next to toggles (TG, TH and TI) as serial data is received sequentially from inputs (LY and LX).

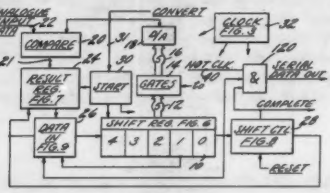
3,573,800
SERIAL ANALOG TO DIGITAL CONVERTER

Thomas E. Gardner, Sunnyvale, Calif., and Jack E. Steffens, West Caldwell, N.J., assignors to United Aircraft Corporation, East Hartford, Conn.

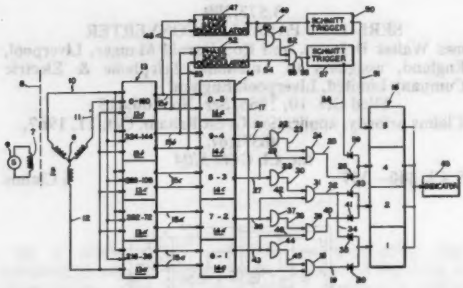
Filed Nov. 14, 1968, Ser. No. 775,667
Int. Cl. H03k *13/02*
U.S. Cl. 340—347AD **16 Claims**

A serial analog-to-digital converter, utilizing well-known successive approximation techniques, employs a shift register

with a variable shift control and selective high order data insertion to eliminate the need for timing registers and complex logic while providing low to high order serial data output capability in a simple configuration.

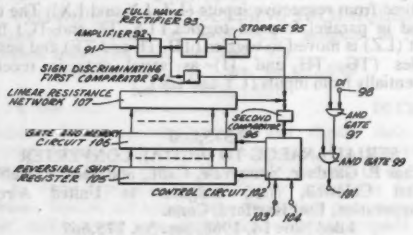


3,573,801
SYNCHRO TO DIGITAL CONVERTER
Richard L. Cohen, Old Bridge, and Frederick R. Sylvander, Rutherford, N.J., assignors to The Bendix Corporation, Teterboro, N.J.
Filed Jan. 18, 1968, Ser. No. 698,929
Int. Cl. G08c 9/04
U.S. Cl. 340—347 **14 Claims**



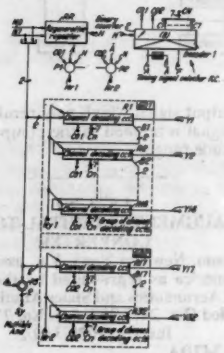
A synchro to digital converter which utilizes the null position to actuate a series of bistable devices to provide the digital count together with phase detectors to resolve ambiguities.

3,573,802
BIPOLAR ANALOG-TO-DIGITAL FEEDBACK ENCODER UTILIZING A REVERSIBLE SHIFT REGISTER
Masao Kawashima; Shigehiko Hinoshita; Shunroku Sasaki, Yokohama-shi, and Shoichi Kurita, Kawasaki-shi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan
Filed Mar. 6, 1969, Ser. No. 804,801
Claims priority, application Japan, Mar. 9, 1968, 43-15295
Int. Cl. H03k 13/00
U.S. Cl. 340—347 **7 Claims**



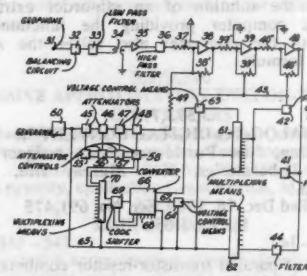
In a nonlinear coder, a weighing resistance network for linear encoding is controlled in accordance with the nonlinear characteristic by selection of the weighing resistance via a reversible shift register.

3,573,803
TIME DIVISION MULTIPLEX DIGITAL-TO-ANALOG CONVERTER
Andre Edouard Joseph Chatelon, Montrouge, and Didier Charles Strube, Garches, France, assignors to International Standard Electric Corporation, New York, N.Y.
Filed Jan. 24, 1969, Ser. No. 793,781
Claims priority, application France, Feb. 20, 1968, 140477
Int. Cl. H03k 13/02
U.S. Cl. 340—347 **10 Claims**



A plurality of binary counters are provided, each of which are assigned to a different channel code, and arranged in two groups. A master binary counter advancing in synchronism with the timing of the input codes and logic circuitry associated with each counter cooperate to cause the counters of one group to convert the code signals of that group and simultaneously connect the counters of the other group in series and to function as shift registers to store serial input codes. The functions of the group of counters are then reversed. The counters of a group in which codes have been previously stored cooperate with the master binary counter and a bistable device coupled to each counter to produce PWM pulses which are filtered to reproduce the analog signals represented by the stored codes.

3,573,804
ANALOG-DIGITAL CONVERTER
Claude H. Picou, Paris, France, assignor to Compagnie Generale de Geophysique, Paris, France
Filed Dec. 23, 1966, Ser. No. 604,211
Claims priority, application France, Jan. 10, 1966, 45,297
Int. Cl. H03k 13/02
U.S. Cl. 340—347 **4 Claims**



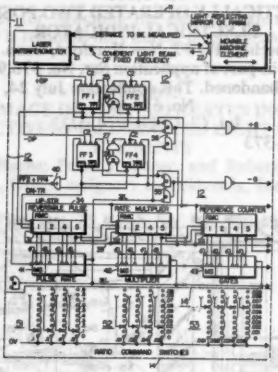
An analog-digital converter has an input for an analog waveform and a reference voltage generator connected to a

device for modifying the output of the generator in selected amplitude steps. A variable gain amplifier is arranged to receive both the analogue input and the modified reference voltage and is connected to a device for producing at repeated instants a digital signal corresponding to the difference between the instantaneous analog input and the modified reference voltage, and a further signal to the modifying device, should the difference be outside a predetermined range. The modifying device is responsive to the further signal to alter the reference voltage fed to the amplifier such that the difference is maintained within the predetermined range.

3,573,805
CONVERSION APPARATUS FOR CONVERTING NONSTANDARD PULSE COUNT TO STANDARD MEASUREMENT COUNT

Leroy U. C. Kelling, Waynesboro, Va., assignor to General Electric Company

Filed Feb. 29, 1968, Ser. No. 709,387
Int. Cl. H03k *13/02*; H04l *3/00*
U.S. Cl. 340—347 **5 Claims**

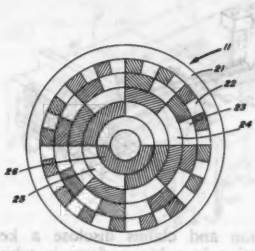


A digitally operable quantity measuring and conversion apparatus is described for deriving precise measurements in terms of recognized measurement units (such as inches or centimeters). The apparatus includes a measuring instrument such as an interferometer position gauging device which develops a number of direction indicating, fringe count pulsed waveform electric signals that are representative of the position of an equipment (such as the working head of a numerically controlled machine tool) being controlled measured with respect to a reference position. The measuring and conversion apparatus further includes digitally operable numerical processing means which preferably comprises a pulse rate multiplier including a reversible pulse rate reference counter. Direction logic circuits are provided for supplying the input pulses fringe count electric signal representative of the quantity (position) to be measured to the reversible pulse rate counter to cause it to count up or down in accordance with the direction information of the input pulsed electric signals. The conversion apparatus further includes pulse rate multiplier gates, and a conversion factor read in circuit for reading the value of a conversion factor to be multiplied into the pulse rate multiplier. The pulse rate multiplier gates are responsive to the output of the reversible pulse rate counter, the conversion factor read in circuit, and the direction logic circuit for providing at the output of the conversion apparatus a desired output summation signal representative of the summation of one incremental conversion factor value for each incremental input fringe count electric signal pulse, and hence representative of the product of the input fringe count pulses multiplied by the conversion factor. In preferred arrangements, conversion factor changing means are included as part of the conversion factor read-in circuit for changing the value of the conversion factor either manually or automatically in response to a change in operating conditions.

3,573,806
NONCONTACT ENCODER INTERPOLATION TECHNIQUE

Aaron David Klein, Rockville, Md. (4016 Briars Road, Olney, Md. 20832)

Filed Sept. 30, 1968, Ser. No. 763,861
Int. Cl. G08c *9/06*
U.S. Cl. 340—347 **7 Claims**

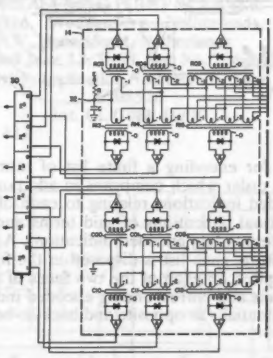


This invention is directed to an optical shaft encoder. The encoder utilizes a binary coded disc whose last track is clear. The output of the photodetector associated with this track is compared by appropriate circuitry with the output of two matched detectors each having an area half that of the first detector. This comparison yields a signal which is an angular function of the position of the disc. A decimal to binary converter is utilized to provide a binary representation of the comparison signal.

3,573,807
DIGITAL ENCODER APPARATUS

George T. Osborne, St. Paul, Minn., assignor to Sperry Rand Corporation, New York, N.Y.

Filed July 30, 1969, Ser. No. 846,121
Int. Cl. G06f *3/02*
U.S. Cl. 340—365 **3 Claims**

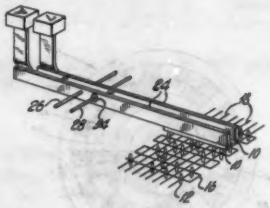


A matrix of switches is arranged in columns and rows with separate column and row conductors coupling, in parallel, all the switches of the respectively associated column and row. A closed switch selects one column conductor and one row conductor, the opposite ends of each of which are serially coupled to a number of input windings that are associated with a like number of transformers. Each transformer is assigned a respectively associated binary value whereby the closing of a switch concurrently induces in the associated output windings output signals that are representative of the associated binary value.

3,573,808
KEYBOARD OR OTHER SIMILAR APPARATUS FOR CONVERTING MECHANICAL MOVEMENT TO A BINARY ELECTRICAL SIGNAL USING PERMANENT MAGNET INHIBITED CORES

Charles B. Pear, Jr., Centerport, N.Y., assignor to Potter Instruments Company, Inc., Plainview, N.Y.

Filed Mar. 25, 1968, Ser. No. 715,857
Int. Cl. G08c 19/28; H04l 15/12
U.S. Cl. 340—365 4 Claims

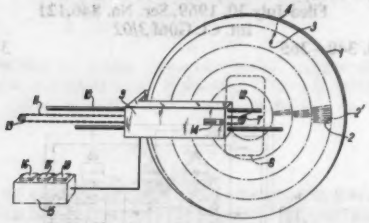


The specification and claims disclose a keyboard for encoding information in a binary form in which a planar array of ferromagnetic cores are normally inhibited from switching by permanent magnets. One of the magnets is raised each time a key is struck and the cores adjacent this magnet are thereby uninhibited and produce an output indicative of the struck key.

3,573,809
DEVICE FOR ENCODING A LIST OF TERMS

Patrick Magnien, Le Mesnil Saint Denis, France, assignor to Commissariat A L'Energie Atomique, Paris, France

Filed May 15, 1968, Ser. No. 729,207
Claims priority, application France, May 19, 1967, 107,093
P 15 37 278.8
U.S. Cl. 340—365 7 Claims



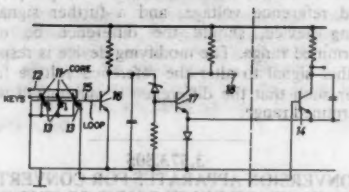
A device for encoding a finite list of terms disposed in alphabetical order which comprises in addition to said list a list of encoded indications relating to each of said terms, a system of visual indications of said terms and a system for reading corresponding encoded indications. According to an essential feature, each list is disposed in the form of a spiral of constant pitch on each of the two faces of a single rotary disc, the terms and corresponding encoded indications being located substantially in opposite and back-to-back relation.

3,573,810
MECHANICALLY ACTUATED MAGNETIC SWITCH ARRANGEMENT

Lorenz Hanewinkel, and Winfried Schneider, Paderborn, Germany, assignors to Nixdorf Computer Aktiengesellschaft

Filed Nov. 12, 1968, Ser. No. 775,059
Claims priority, application Germany, Nov. 10, 1967,
P 15 37 278.8
Int. Cl. G08c 9/00
U.S. Cl. 340—365 7 Claims

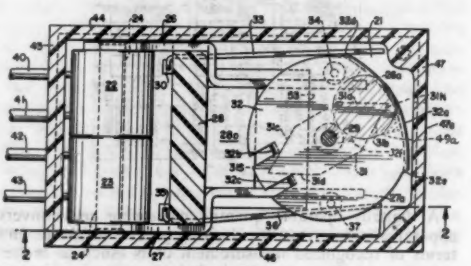
A mechanically actuated magnetic switch arrangement includes a plurality of closed magnetic cores and a plurality of windings on each core. A magnetic saturation element is near each core, and means respond to actuation of a switch lever associated with each core for permitting or preventing saturation of that core. A rest-position loop is connected to one winding on each core and delivers an input signal to an amplifier. The output of the amplifier is connected to an electronic lock for preventing more than one signal at a time from emanating from the switch arrangement.



3,573,811
MAGNETICALLY OPERATED TWO POSITION ELECTRICAL INDICATOR

William A. Knecht, RFD #2, New Hartford, Conn. 06057

Continuation-in-part of application Ser. No. 570,937, Sept. 8, 1966, now abandoned. This application July 24, 1967, Ser. No. 655,641
Int. Cl. G08b 5/14, 5/22
U.S. Cl. 340—373 35 Claims



An indicator to show either of two conditions of an electrical circuit and including an electromagnetic structure with poles and coil means to energize the poles alternatively to either magnetic polarity, and also including a permanently magnetized armature with indicia thereon, either directly or on an attached member, the electromagnetic structure and armature with indicia being included within a housing that has at least one window through which the indicia may be seen to indicate whether the armature is in one or the other of two end positions determined by the current in the coil in response to the external circuit. The poles of the electromagnet may cooperate with the permanently magnetized armature to hold the latter in either of the end positions while allowing easy transfer to the other end position when current flow is reversed.

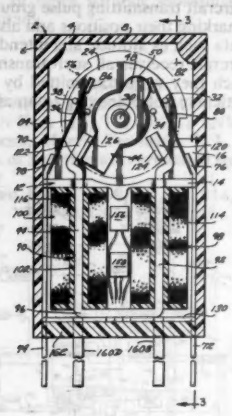
3,573,812
ELECTROMAGNETIC INDICATOR

George E. Pihl, Abington, Mass., assignor to Miniature Electronics Components Corp., Holbrook, Mass.

Filed Nov. 6, 1967, Ser. No. 680,668
Int. Cl. G08b 5/22
U.S. Cl. 340—373 11 Claims

A two-state electromagnetically actuated indicator providing in each state a display that is magnetically latched, regardless of the removal or reapplication of voltage, until a

proper reset signal is applied. The illustrated embodiment also features internal switching for controlling associated

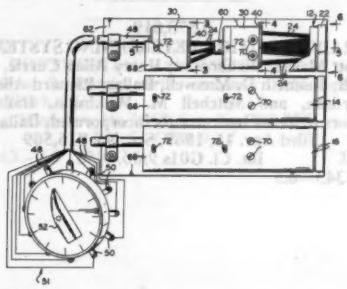


equipment or for switching the electromagnet unit so that drive energy is required only during display transition.

3,573,813
LIGHT IMAGE DISPLAY APPARATUS INCLUDING SELECTIVELY ILLUMINATED LIGHT PIPING ELEMENTS

Andrew R. Burns; Peter J. Unger, and Robert J. Rossman, Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Oct. 25, 1968, Ser. No. 770,483
Int. Cl. H04l *23/00, 3/00*
U.S. Cl. 340—380 **15 Claims**

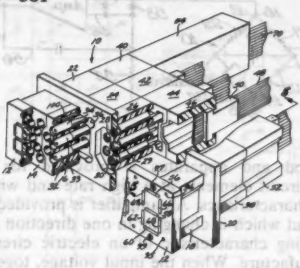


A light image display apparatus is described in which a plurality of light transmission elements are employed together with means for selectively applying light to the input ends of such elements in order to form a light image display by the illuminated output ends of such elements and to successively produce different images in the same display area by illuminating different combinations of elements. The light transmission elements may be flexible fibers of plastic or glass which are arranged in optically noncoherent bundles with the input ends of all elements in a bundle being irradiated simultaneously by the same light source and with the output ends of such elements being supported in different relative positions and spaced over a greater area than the input ends. The display apparatus may be used as a switch position readout for the switches on a cathode-ray oscilloscope controlling its vertical amplifier gain and horizontal sweep rate by turning light bulbs on and off with such switches to selectively illuminate the light transmission elements and thereby produce light image displays of the switch positions. The switch position readout displays are positioned adjacent the faceplate of the cathode-ray tube employed in such oscilloscope, so that they may be viewed or photographed simultaneously with the electrical signal waveform produced on such tube to indicate the horizontal and vertical scale units of such waveform.

3,573,814
LIGHTED DISPLAY UNITS

William J. Lang, Orange, Calif., assignor to Symbolic Displays, Inc., Orange, Calif.

Filed June 7, 1968, Ser. No. 735,255
Int. Cl. G09f *9/00*
U.S. Cl. 340—381 **7 Claims**

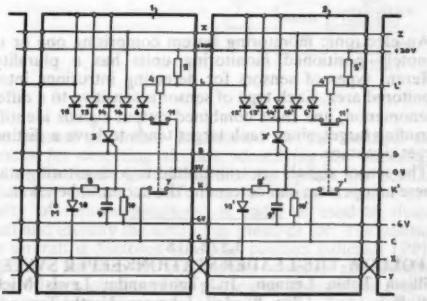


This invention relates to improvements in lighted display units of the kind in which individual characters are associated with one another to form a composite display. In the embodiment described, the unit is modularized in part with each module being specific to one character so that a composite display is formed by combining modules. There is provided, with respect to each character to be displayed, a front panel section including indicia portions which when lighted provide a representation of a selected character, a heat sink, and a lamp socket and socket holder assembly which is provided with lamp sockets oriented to underlie the individual segments of the character to be displayed. The heat sink and light shield unit is sandwiched between the front panel and the socket holder and is provided with individual bores of size to accommodate a single lamp bulb in alignment with the socket for that bulb and the indicia section to be lighted thereby.

3,573,815
MEASURING POINT SCANNER

Johannes Leijten, Woudenberg, Netherlands, assignor to Electrofact N.V., Amersfoort, Netherlands

Filed June 13, 1968, Ser. No. 736,823
Claims priority, application Netherlands, June 19, 1967, 6708520
Int. Cl. G08b *19/00*
U.S. Cl. 340—413 **23 Claims**



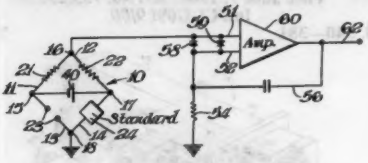
A device for successively scanning and monitoring a plurality of measuring points which device provides an alarm when a measured point exceeds a predetermined value and a different alarm when there is a malfunction in the device itself.

3,573,816

PRODUCTION OF ELECTRIC CIRCUIT ELEMENTS

Walter Helgeland, Nashua, N.H., assignor to Sprague Electric Company, North Adams, Mass.

Filed Apr. 25, 1966, Ser. No. 544,731
Int. Cl. G08b 1/08
U.S. Cl. 340—419 **4 Claims**



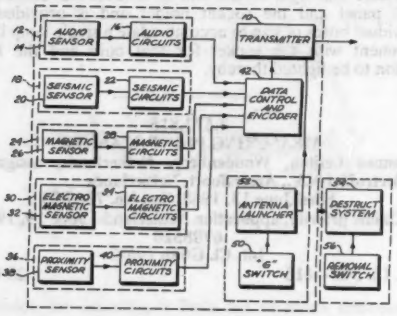
A method and apparatus is provided for producing electrical circuit elements at a high rate and with accurate electrical characteristics. An amplifier is provided with a DC voltage input which is changing in one direction in response to a changing characteristic of an electric circuit element under manufacture. When the input voltage, together with a regenerative feedback from the amplifier output, reaches a predetermined value, the amplifier produces a pulse output which can be used to terminate the circuit element manufacture.

3,573,817

MONITORING SYSTEM

Artie E. Akers, San Diego, Calif., assignor to North American Rockwell Corporation

Filed Feb. 28, 1968, Ser. No. 710,710
Int. Cl. G08b 19/00, 15/00
U.S. Cl. 340—420 **8 Claims**



An electronic monitoring system comprising one or more remotely positioned monitoring units has a plurality of different types of sensors for detecting intrusions into the monitored area. Each type of sensor is sensitive to a different phenomenon, and their combined output signals identify an intruding target; since each target tends to have a distinctive target signature.

The sensor signals are transmitted to a monitoring-station, where an operator can determine the action to be taken.

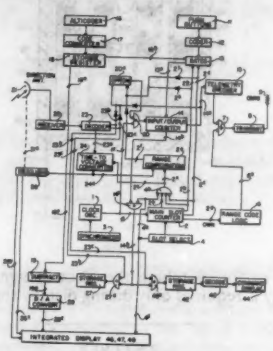
3,573,818

FOLLOW-THE-LEADER STATIONKEEPER SYSTEM

William Tobin Lennon, Jr., Tonawanda; Lewis Michnik, Buffalo, and Allen Burdell Johnson, North Tonawanda, N.Y., assignors to Sierra Research Corporation

Filed Aug. 15, 1968, Ser. No. 752,854
Int. Cl. G01s 9/56
U.S. Cl. 343—6.5 **10 Claims**

A stationkeeping system for maintaining the positions of aircraft operating in a follower mode with respect to other nearby aircraft which may be designated to operate in a leader mode, all aircraft having accurately synchronized time clocks, and the aircraft transmitting pulse groups during their own time slots, marking their positions and also telemetering other encoded data such as altitude and intended maneuvers. Each follower aircraft receives all such transmissions during time slots in which they were transmitted by other aircraft, and selects a particular slot belonging to an aircraft which it chooses to follow. It processes the received data and displays it by a cluster of instruments showing spacing relative to the selected aircraft both in the direction of flight, and transversely thereof, as well as differential altitude and intended maneuvers, such instruments including means for entering offsets defining relative positions which it is desirable for the follower to maintain.

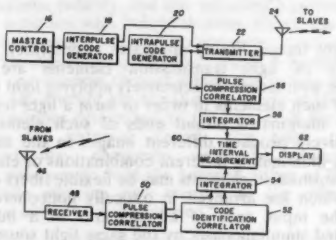


3,573,819

RADIO POSITION DETERMINING SYSTEM

Jack Scott Mason, Richardson; Harry Allen Currie, Farmers Branch; Kenneth D. Maxwell, Dallas; Richard Allen Perry, Richardson, and Mitchell M. Wilkinson, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

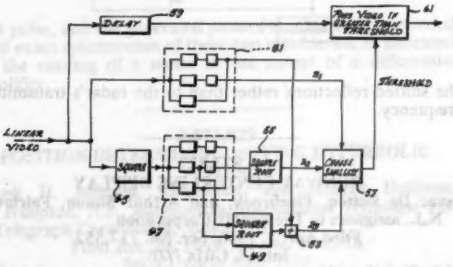
Filed Apr. 16, 1969, Ser. No. 816,509
Int. Cl. G01s 9/06, 9/56
U.S. Cl. 343—6.5 **4 Claims**



A master station onboard a vessel transmits coded pulses to a pair of shore stations. The shore stations respond with transmissions of coded pulses which are received by the master station. The round trip traveltime of the pulses is then measured to compute the distance of the vessel from each of the shore stations for determination of the position of the vessel. Pulse compression techniques are utilized by the

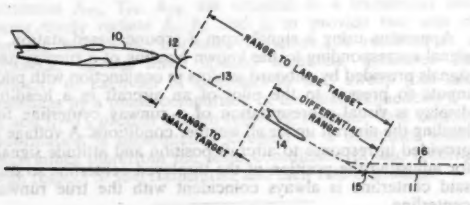
system in order to provide accurate resolution at ranges up to several hundred miles from shore and to enable operation of the system at all times without substantial degradation of resolution accuracy.

3,573,820
METHOD AND SYSTEM OF RANGE SIDELOBE REJECTION IN A MULTITARGET ENVIRONMENT
Peter K. Bohacek, Morris Township, N.J., assignor to the United States of America as represented by the Secretary of the Air Force
Filed Apr. 8, 1969, Ser. No. 814,317
Int. Cl. G01s 9/02, 7/28
U.S. Cl. 343—7 **3 Claims**



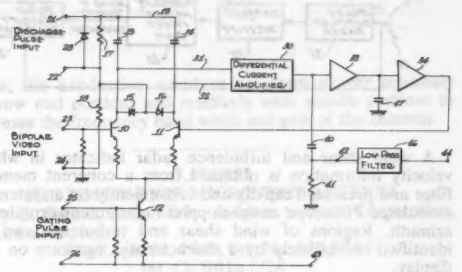
A method and system of determining range sidelobe radar return by forming two thresholds, one formed by coherent addition and the other formed by rms addition and then the smaller threshold is selected. The video signal is then compared to the selected threshold.

3,573,821
DIFFERENTIAL RANGING SYSTEMS
Neil C. Kern, Scottsdale, Ariz., assignor to Motorola Inc., Franklin Park, Ill.
Filed Jan. 10, 1969, Ser. No. 790,327
Int. Cl. G01s 9/14
U.S. Cl. 343—7.3 **2 Claims**



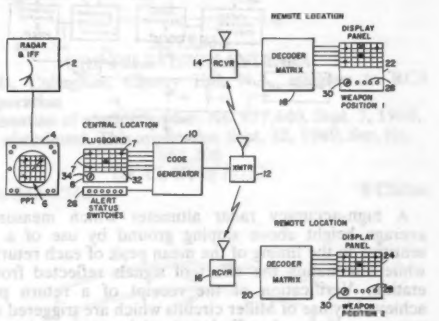
A radar transmitter and receiver showing a single antenna system of the monopulse type tracks a small target having a relative motion with respect to a large target, both located on a common boresight. A differential ranging circuit measures the difference between the tracked small target and the tracked large target. Upon the differential range reaching a predetermined threshold, a command signal is generated and transmitted to the small target causing it to perform a function.

3,573,822
RANGE GATED DOPPLER FILTER
Thomas W. J. Kennedy, Belleville, Ontario, Canada, assignor to Northern Electric Company Limited, Montreal, Quebec, Canada
Filed Sept. 18, 1969, Ser. No. 859,062
Int. Cl. G01s 9/42; H03k 5/20
U.S. Cl. 343—7.7 **5 Claims**



A range-gated doppler filter having a balanced input switch with cancelling feedback supplied to the switch from a following low-pass filter section.

3,573,823
METHOD AND APPARATUS FOR ALERTING REMOTE PERSONNEL OF AIRCRAFT, LOCATION AND IDENTIFICATION
John A. French, Huntsville, Ala., assignor to the United States of America as represented by the Secretary of the Army
Filed Sept. 3, 1969, Ser. No. 854,844
Int. Cl. G01s 7/12, 9/56
U.S. Cl. 343—6 **5 Claims**

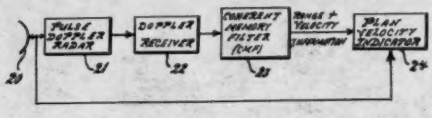


The present invention is directed to the method and apparatus for detecting aircraft, identifying the aircraft as friend or foe, and transmitting alerting signals, the position and identity of the aircraft from a central location to a plurality of remote locations. A radar is used to detect aircraft and identify the aircraft as friend or foe. The position of the aircraft is disclosed on a plan position indicator (PPI). An operator transfers the information (position and identity) on the PPI to a plugboard by placing an appropriate plug in the plugboard to indicate the aircraft as friend or foe and to show the location of the aircraft. The information from the plugboard is encoded and transmitted to a plurality of remote locations. The information received at the remote locations is decoded and displayed such that an operator at the remote location may determine the location and identity of the aircraft detected by the radar.

3,573,824
WIND SHEAR AND TURBULENCE RADAR INDICATOR

Graham M. Armstrong, Framingham, and Ralph J. Donaldson, Jr., Sudbury, Mass., assignors to the United States of America as represented by the Secretary of the Air Force

Filed Apr. 21, 1969, Ser. No. 817,945
Int. Cl. G01s 9/42; G01w 1/00
U.S. Cl. 343—9 2 Claims

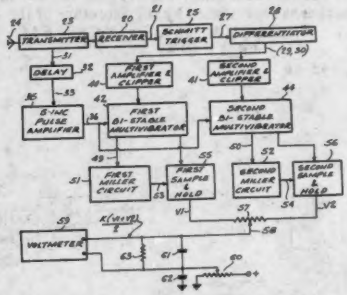


A wind shear and turbulence radar indicator in which velocity information is obtained from a coherent memory filter and presented rapidly and conveniently on an intensity modulated PPI scope as the doppler radar antenna rotates in azimuth. Regions of wind shear and turbulence can be identified immediately by a characteristic signature on this display.

3,573,825
RADAR SYSTEM

Ray L. Westby, Ottawa, Ontario, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada

Filed June 11, 1969, Ser. No. 832,227
Int. Cl. G01s 9/20
U.S. Cl. 343—13 8 Claims



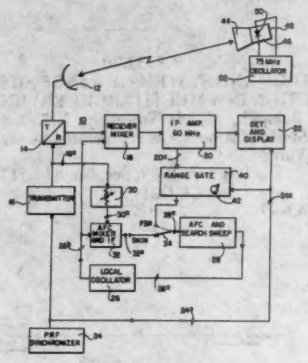
A high-accuracy radar altimeter which measures the average height above sloping ground by use of a circuit sensitive to the timing of the mean peak of each return pulse while eliminating the effect of signals reflected from vegetation. Verification of the receipt of a return pulse is achieved by use of Miller circuits which are triggered on by a return pulse and off by a delayed sample of the corresponding transmitted pulse.

3,573,826
BEACON CALIBRATED AFC RADAR

Duane G. Fredericks, Lockport, and Lewis Michnik, Buffalo, N.Y., assignors to Sierra Research Corp.

Filed Apr. 10, 1969, Ser. No. 815,067
Int. Cl. G01s 7/40
U.S. Cl. 343—17.7 6 Claims

In combination with a radar unit having automatic frequency control means for tuning its receiver accurately to its transmitter, means for calibrating the radar unit with respect to range by using a frequency shift reflector located a known distance from the radar unit and serving to provide echos at a different frequency than normal skin reflections, the radar unit being provided with a range gate to selectively pass substantially only the shifted reflections through the receiver and with switching means to transfer the automatic frequency control circuit to be responsive to the frequency of

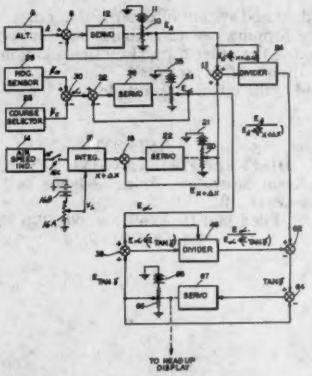


the shifted reflections rather than to the radar's transmitted frequency.

3,573,827
RUNWAY CENTERLINE DISPLAY

Isaac De Botton, Pinebrook, and Arthur Simon, Fairlawn, N.J., assignors to The Bendix Corporation

Filed Apr. 1, 1968, Ser. No. 717,552
Int. Cl. G01s 1/16
U.S. Cl. 343—108 7 Claims



Apparatus using a signal from a ground based station, a signal corresponding to the known heading of a runway and signals provided by onboard sensors in conjunction with pilot inputs to present to the pilot of an aircraft in a head-up display a visual representation of a runway centerline for landing the aircraft under all weather conditions. A voltage is provided in response to aircraft position and attitude signals for adjusting the position of the displayed centerline so that said centerline is always coincident with the true runway centerline.

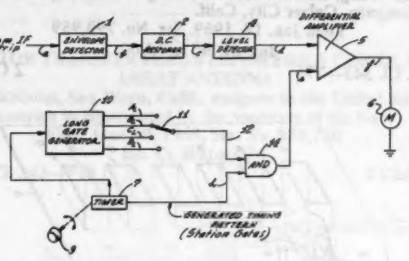
3,573,828
SYNCHRONIZATION INDICATOR

Opie D. Hawley, San Pedro, Calif., assignor to Northrop Corporation, Beverly Hills, Calif.

Filed Apr. 15, 1969, Ser. No. 816,353
Int. Cl. G01s 1/30
U.S. Cl. 343—105 7 Claims

In order to synchronize a locally generated timing pattern in a receiver with a transmitted timing pattern as received, the strongest signal in the received pattern is separated from all others and transformed into a first pulse having the same

timing as that strongest signal. At the same time, the pulse of the generated pattern which corresponds to the strongest station at the present receiver location, as determined by the operator's knowledge, is compared in time relation to the



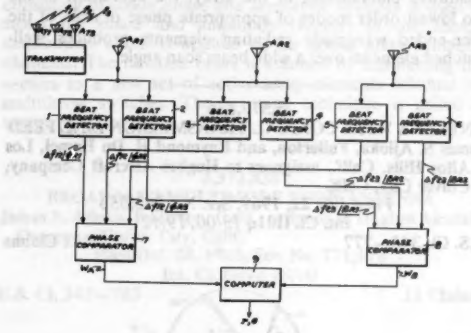
first pulse, and the generated pattern is advanced or retarded until exact synchronism of these two is achieved, as indicated by the reading of a meter in the output of a differential amplifier.

3,573,829

POSITION DETERMINING MOVING HYPERBOLIC SYSTEM

Frank H. Johnson, Ridgewood, and Murray Hoffman, Livingston, N.J., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Jan. 29, 1969, Ser. No. 794,978
Int. Cl. G01s *1/04, 1/30*
U.S. Cl. 343—105 **10 Claims**



In order to determine relative position, three spaced antennas A_{T1}, T_{T2}, A_{T3}, are coupled to a transmitter and respectively radiate f_1, f_2, and f_3 to provide two sets of moving hyperbolic isophases in space. A receiver at a distance, having three spaced antennas, measures the velocity of each set of isophases as they sweep past said antennas by a phase comparison of the beat frequencies f_1-f_2 and f_2-f_3 present at each receiving antenna. Said velocity information is subsequently coupled to a computer which determines therefrom the polar coordinates of said receiver with respect to said transmitter and their rate of change.

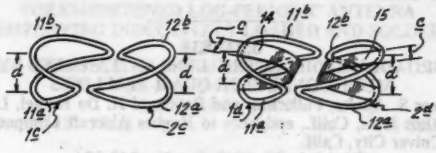
3,573,830

LOOP ANTENNA

Motomu Tadama, Kanagawa-ken; Kosuke Akiba, Tokyo; Toshitada Doi, Kanagawa-ken; Masashi Mikkaichi; Tetsuya Mori, and Risaburo Sato, Miyagi-ken, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 7, 1969, Ser. No. 797,513
Claims priority, application Japan, Feb. 8, 1968, 43/7861
Int. Cl. H01q *7/00*
U.S. Cl. 343—741 **1 Claim**

In a directional loop antenna, particularly for television receivers, in which a pair of arcuate conductive members are mounted in opposed relation with their concave sides facing each other to define a loop, a dummy load is connected between two of the adjacent ends of the conductive members and output terminals are connected to the opposite adjacent



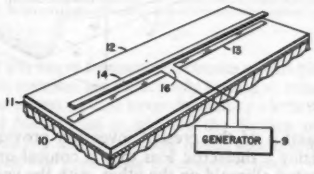
ends, the conductive members are formed with relatively narrow end portions and relatively wide middle portions to increase the frequency band width and gain of the antenna.

3,573,831

PROXIMITY FUZE MICROSTRIP ANTENNA

Gary L. Forbes, Holt, Mich., assignor to Avco Corporation, Richmond, Ind.

Filed Apr. 28, 1969, Ser. No. 819,884
Int. Cl. H01q *1/28*
U.S. Cl. 343—705 **4 Claims**



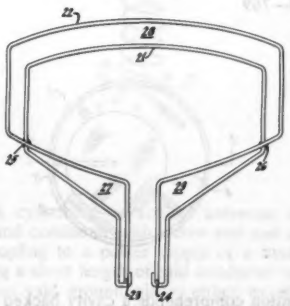
An energy radiator for use in small projectiles is disclosed. Effective wave propagation is achieved from the radiator by propagating energy along two conductors, one of which is placed above the other as a parasitical element in which the voltage node is displaced approximately 0° with respect to the voltage node of the first conductor.

3,573,832

UHF TELEVISION ANTENNA

John D. Callaghan, Cherry Hill, N.J., assignor to RCA Corporation

Continuation of application Ser. No. 577,640, Sept. 7, 1966, now abandoned. This application Sept. 25, 1969, Ser. No. 861,200
Int. Cl. H01q *11/12*
U.S. Cl. 343—742 **5 Claims**



A UHF television band antenna includes two or more conductive loops, at least one of which is broken and is provided with terminals adapted for connection to a television receiver. One of the loops has a perimeter equal to one wavelength at a frequency within the UHF band. The

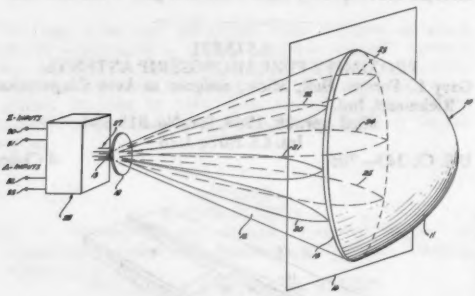
loops are positioned and interconnected in such a fashion that no subloop, formed by unbroken lengths of wires defining two or more of said loops, has a perimeter equal to the wavelength corresponding to any frequency within the UHF band.

3,573,833

BROADBAND DIELECTRIC LENS ANTENNA FED BY MULTICONDUCTOR QUASI-TEM LINES

James S. Ajioka, Fullerton, and Raymond H. Du Hamel, Los Altos Hills, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 22, 1969, Ser. No. 843,554
Int. Cl. H01q *19/06*
U.S. Cl. 343—753 10 Claims



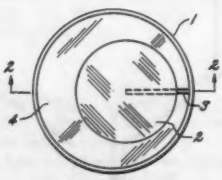
The apparatus of the present invention provides a feed system utilizing a dielectric lens that is conical on one side and a truncated ellipsoid on the other, with the vertex of the cone coinciding with the focal point of the ellipsoid that is farthest from the convex side thereof. No less than two angular or conical conductors emanating from a multiple-port feed network are disposed longitudinally along the conical portion of the dielectric lens to the point of maximum lens diameter, whereat the conductors are connected together. To achieve monopulse capability and dual polarization, a multiconductor TEM line having no less than five conductors with the proper relative phasing therebetween is used to feed the lens. Proper relative phasing between lines is achieved with a broadband hybrid network.

3,573,834

CRESCENT SHAPED CAVITY BACKED SLOT ANTENNA

William J. McCabe, Tewksbury, and Chester J. Hunt, Melrose, Mass.

Filed Oct. 31, 1968, Ser. No. 772,300
Int. Cl. H01q *13/12*
U.S. Cl. 343—769 10 Claims



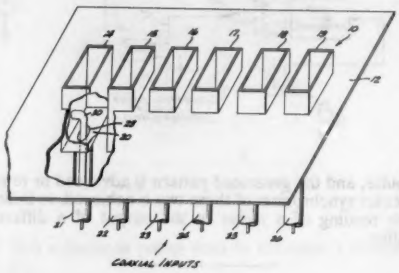
The invention comprehends a cavity backed slot antenna having improved RF bandwidth characteristics. The cavity is cylindrical and has a series coaxial transmission line feed which provides radially symmetrical TEM mode cavity field excitation. The slot is substantially crescent shaped. A radially disposed vane member within the cavity is used to generate an internal E field.

3,573,835

IMPEDANCE MATCHED OPEN-ENDED WAVEGUIDE ARRAY

Louis Stark, Fullerton; Raymond Tang, Anaheim, and Nam San Wong, La Habra, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed Jan. 14, 1969, Ser. No. 790,959
Int. Cl. H01q *13/00*
U.S. Cl. 343—776 2 Claims



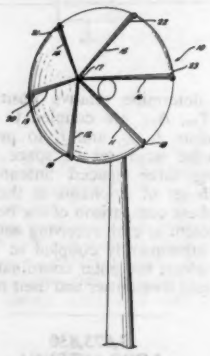
The apparatus of the present invention provides an open-ended waveguide array wherein the impedance of the array elements are efficiently matched over a wide beam scan angle at reasonable cost. This impedance matching is achieved by employing open-ended waveguide radiators which are capable of supporting multiple waveguide modes for the respective radiating elements. In the operation of an illustrative embodiment of the array, the excitation of the two lowest order modes of appropriate phase in each of the open-ended waveguide radiating elements produces well-matched elements over a wide beam scan angle.

3,573,836

ANTENNA WITH CONICAL TRANSMISSION LINE FEED

James S. Ajioka, Fullerton, and Raymond H. Du Hamel, Los Altos Hills, Calif., assignors to Hughes Aircraft Company, Culver City, Calif.

Filed July 22, 1969, Ser. No. 843,553
Int. Cl. H01q *13/00, 19/12*
U.S. Cl. 343—777 12 Claims



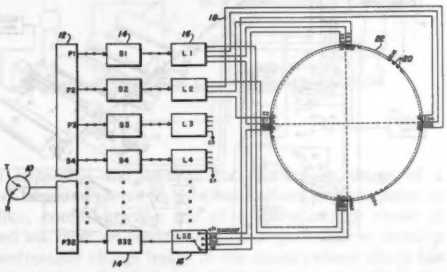
The apparatus of the present invention provides an antenna with a dual circularly polarized monopulse feed system which employs a conical or angular transmission line to guide a transverse electromagnetic spherical wave to a reflector. For an n element conical transmission line feed where n is a positive integer no less than three, normal modes with phase progressions or delays of $360°/n$ from one element to the next are used to illuminate the reflector for rotationally symmetric sum patterns with either sense of circular polarization. Similarly, for an n element conical

transmission line feed where n is a positive integer no less than five, normal modes with phase progressions or delays of $720°/n$ from one element to the next are used to illuminate the reflector for rotationally symmetric difference patterns with either sense of circular polarization.

3,573,837
VECTOR TRANSFER FEED SYSTEM FOR A CIRCULAR ARRAY ANTENNA

John Reindel, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed June 30, 1969, Ser. No. 838,730
Int. Cl. H01q 3/26
U.S. Cl. 343—778 **2 Claims**

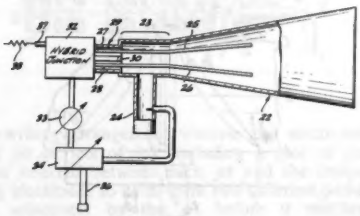


A feed system for a circular array antenna which is steerable through 360° in a predetermined number of discrete steps is disclosed. A beam forming network consisting of diode phase and amplitude switches is used to select the phase and amplitude (vector) of the energy distribution which is applied to the active array radiating elements. The radiated beam is scanned by transferring the vectors to a new set of active array elements selected by multithrow switches. The scanning technique is called a vector transfer.

3,573,838
BROADBAND MULTIMODE HORN ANTENNA

James S. Ajioka, Fullerton, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed Oct. 28, 1968, Ser. No. 771,178
Int. Cl. H01q 13/00
U.S. Cl. 343—783 **11 Claims**

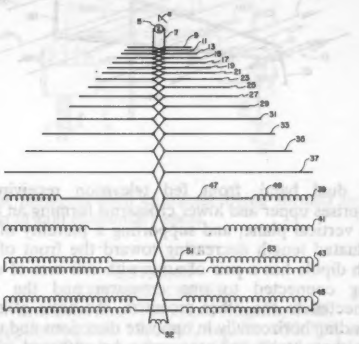


The apparatus of the present invention provides a horn antenna capable of generating a pattern with rotational symmetry and polarization purity over a broadband of frequencies with comparatively low side lobes. In achieving this operation, a first mode which propagates as a "slow wave" is launched through a first portion of the horn and is converted to a second mode which propagates as a "fast wave" through the remaining portion. At the aperture of the horn, the resulting wave combines with a "medium wave" which normally propagates along the entire length of the horn, to achieve the desired aperture distribution. Since the slow wave and the fast wave compensate each other for frequency changes, the overall desired aperture distribution can be sustained over a broad range of frequencies.

3,573,839
FORESHORTENED LOG-PERIODIC ANTENNA EMPLOYING INDUCTIVELY LOADED AND FOLDED DIPOLES

James C. Parker, Jr, Northville, Mich.

Filed Apr. 24, 1969, Ser. No. 819,065
Int. Cl. H01q 11/10
U.S. Cl. 343—792.5 **6 Claims**

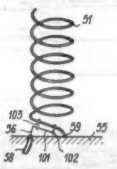


Some of the lower frequency elements of this planar dipole log periodic antenna are inductively loaded to reduce the size thereof and others of said lower frequency elements are both loaded and folded, and in addition the dipoles are provided with a mounting and supporting boom which also functions as a balanced low impedance transmission line.

3,573,840
SMALL BULK HELICALLY WOUND ANTENNAE AND METHOD FOR MAKING SAME

Roger L. Gouillou, Draveil; Guy F. Ringenbach, Villeneuve-le-Roy, and Jacques H. Delomini, Epinay-sur-Seine, France, assignors to Office National D'Etudes Et De Recherches Aerospatiales, Chatillion-Sous-Bagneux, France

Filed Dec. 9, 1968, Ser. No. 782,337
Claims priority, application France, Dec. 15, 1967, Feb. 26, 1968, 132,155;141,294
Int. Cl. H01q 1/36
U.S. Cl. 343—895 **9 Claims**



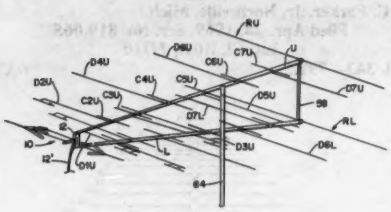
Small bulk cylindrical or conical antennae made of a helically wound conductor with a free end and a grounded end. The coupling to a power supply or a load circuit is effected along a short length of said conductor near to and terminating on said ground plane, either by direct shunt coupling or by inductive coupling. The grounded end can be provided with a capacitive load. The antennae can be manufactured by sticking a metal strip to a dielectric sheet and rolling the latter to the desired shape, or by printing circuit technique and subsequent winding to said shape, in which they may be kept by clamping, glueing or any other method.

3,573,841

TELEVISION RECEIVING ANTENNA

Harry Greenberg, Kerhonkson, N.Y., assignor to Avnet, Inc., New York, N.Y.

Filed May 27, 1968, Ser. No. 732,427
Int. Cl. H01q 21/12
U.S. Cl. 343—802 17 Claims



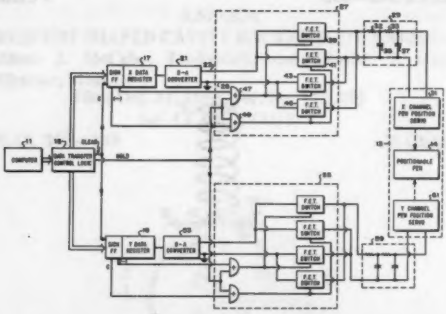
A dual band, front fed television receiving antenna comprises upper and lower crossarms forming an acute angle in a vertical plane, and supporting a plurality of dipoles of graduated length decreasing toward the front of the array. Each dipole has a pair of arms with one arm of each dipole being connected to one crossarm and the other arm connected to the other crossarm, the arms of each dipole extending horizontally in opposite directions and transversely from their associated crossarms. An outboard, close-spaced parasitic element is associated with each arm of those dipoles which have an effective length of approximately one full wavelength at a frequency in the high VHF band. Certain of the dipoles have a centrally located close-spaced parasite associated with each of their two dipole arms. UHF elements may be similarly connected to the respective crossarms with at least some of the UHF elements physically located between the two frontmost VHF dipoles.

3,573,842

CONTROL SYSTEM FOR X-Y GRAPHICAL RECORDER

Robert W. Colpitts, East Palo Alto, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 24, 1969, Ser. No. 801,300
Int. Cl. G01d 9/40
U.S. Cl. 346—29 7 Claims



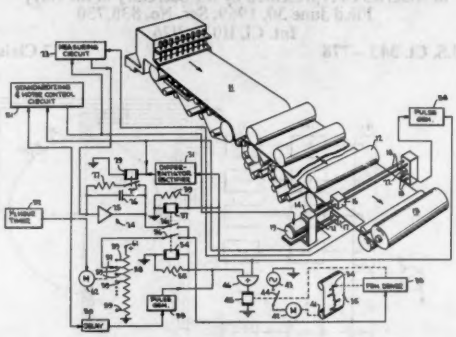
An X-Y graphical recorder has a pen which is positionable by a two-channel control system responsive to X and Y digital data from a computer. Each channel of the control system includes the series combination of a storage register, a digital-to-analogue converter, gated switching means, a filter and memory-hold circuit, and a servomechanism for driving the positionable pen. The gated switching means of the two channels are operated simultaneously to apply analogue pen control signals of either normal or reverse polarity to the corresponding filter and memory-hold circuits. The pen is moved in X and Y directions simultaneously, at the same percentage displacement rate to draw a straight-line segment between two points on a graph.

3,573,843

DATA AND TIME RECORDER

Bill W. Solley, Columbus, Ohio, assignor to Industrial Nucleonics Corporation

Filed Feb. 16, 1968, Ser. No. 706,103
Int. Cl. G01d 9/34
U.S. Cl. 346—34 11 Claims



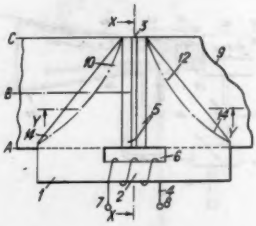
Disclosed is a strip chart recorder having a pen driven by amounts proportional to measured data and analogue time indicating signals on a time division multiplex basis. The chart is advanced as each signal is fed to the pen. The time indicating signals are fed to the pen at will or periodically. In the latter case, the time-indicating signals are generated when a gauge deriving the measured data is being standardized.

3,573,844

MAGNETIC RECORDING HEAD WITH A VARIABLE RELUCTANCE PATH

Gerald Marvin Gardner, Stansted, Essex, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed June 26, 1968, Ser. No. 740,138
Claims priority, application Great Britain, July 14, 1967, 32,457/67
Int. Cl. G01d 15/12; G11b 5/22, 5/08
U.S. Cl. 346—74 7 Claims



A magnetic recording head having a single magnetic recording gap extending across the width of a recording medium which moves transversely thereto. A signal to be recorded, represented by pulses of alternating polarity and sequentially decreasing magnitudes, is applied to a signal winding which develops a magnetic flux. This flux follows a reluctance path which reduces from a maximum at one end of the head to a minimum at the other end of the head due to the combination of the placement of said winding at one end of said head, and the shape of said head, thereby causing successive portions in time of the signal to be recorded

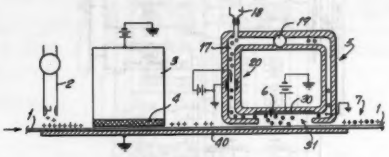
transversely in spatial sequence across the width of said medium.

3,573,845

ACOUSTIC IMAGE REPRODUCTION SYSTEM USING A PIEZOELECTRIC PRINTER AND ELECTROGASDYNAMICS

Meredith C. Gourdine, West Orange, N.J., assignor to Gourdine Systems, Inc., Essex County, N.J.

Filed Feb. 27, 1969, Ser. No. 803,021
Int. Cl. G01d *15/06*; H01v *7/00*; G11b *9/00*
U.S. Cl. 346—74 **10 Claims**



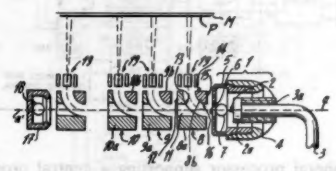
An apparatus and method for printing an image of a pattern of sound waves on a dielectric sheet, such as paper or the like, comprising the use of a space charge cloud of ionized ink from an electrogasdynamic generator to develop an electrostatic charge image of the sound pattern which has been formed on the dielectric sheet using an acoustic image converter plate. By virtue of the high charge on the ink, a high quality image is developed on the sheet even though the sound wave patterns resulting from ultrasonic scanning of a test object or from the energizing of an acoustical transducer may be comparatively weak.

3,573,846

PLURAL PATH INK JET WRITING ARRANGEMENT

Enzo Ascoli, Lausanne, Vaud, Switzerland, assignor to Paillard S.A., Sainte-Croix, Vaud, Switzerland

Filed Aug. 19, 1969, Ser. No. 851,363
Claims priority, application Switzerland, Sept. 4, 1968, 13295/68
Int. Cl. G01d *15/18*
U.S. Cl. 346—75 **7 Claims**



A line-writing arrangement wherein the electrostatically deflected jet or jets of ink including a pair of auxiliary electrodes inserted between each jet and the cooperating deflecting electrodes so as to form two different paths to be followed selectively by the jet before it reaches said deflecting electrodes.

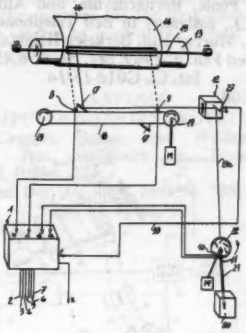
3,573,847

CHARACTER RECORDER

Giorgio Sacerdoti, Milan, Italy, assignor to Olivetti-General Electric S.p.A., Caluso(Torino), Italy

Continuation of application Ser. No. 501,950, Oct. 22, 1965, now abandoned. This application Aug. 22, 1969, Ser. No. 852,987
Int. Cl. G06k *15/02*
U.S. Cl. 346—76 **6 Claims**

A recording apparatus is shown in which serial printing of characters is achieved on a radiation sensitive print medium, by means of a radiation beam, modulated and deflected so as to scan a print area and to sensitize elementary spots serially



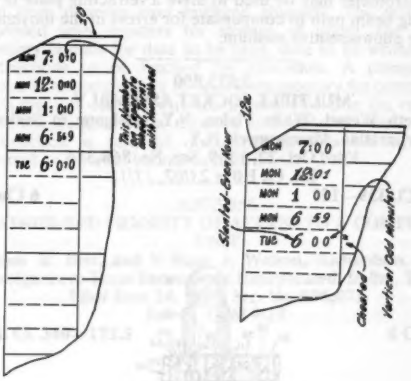
on the print medium, each character being formed by the combination of said elementary spots.

3,573,848

TIME RECORDER

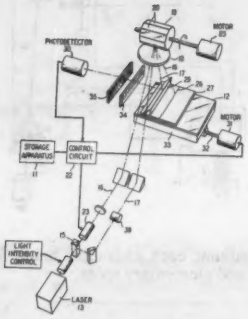
Wardell L. Ward, P.O. Box 75982, Los Angeles, Calif.

Original application Dec. 18, 1967, Ser. No. 691,379, now Patent No. 3,484,790, dated Dec. 16, 1969. Divided and this application Oct. 22, 1969, Ser. No. 871,235
Int. Cl. G07c *1/06*
U.S. Cl. 346—82 **2 Claims**



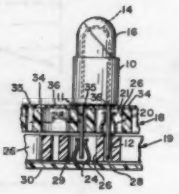
Existing industrial time clocks are capable of being misused by employing screening or cheater cards which are placed against, and inserted with, the usual time clock card, so as to blank out the printing of minutes with one insertion of the card, and the hour, on a second insertion. By such manipulation, employees can record on the card almost two extra hours of time which the time card will then indicate was worked by the employee. Such time clock cheating is prevented by the present invention in which special means are provided for use with the minute printing wheel to indicate the true hour when the minutes are printed on the card. Among the possible means shown are an additional hour wheel printing closely in conjunction with the minute wheel, either in plain figures or in code; an alternately colored ribbon for printing different consecutive hours; different character printing for different consecutive hours; different minute wheel disposition for different consecutive hours; and different card dispositions in relation to the printing wheels for different consecutive hours.

3,573,849
PATTERN GENERATING APPARATUS
Donald R. Herriot, Morris Township, Morris County; Kenneth M. Poole, Bernardsville, and Alfred Zacharias, Plainfield, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, Berkeley Heights, N.J.
Filed Feb. 4, 1969, Ser. No. 796,456
Int. Cl. G01d 15/14
U.S. Cl. 346—108 11 Claims



Stored data representative of a pattern or image to be reproduced modulates a writing light beam that is reflected by a rotating mirror structure to scan a photosensitive medium. A coding beam scans a code plate in synchronism with the writing beam to generate a code signal used for controlling modulation of the writing beam. A scanning lens having a nonuniform focal length is used to make the linear scan velocity of the writing beam more uniform. An interferometer may be used to drive a refracting plate in the writing beam path to compensate for errors in the movement of the photosensitive medium.

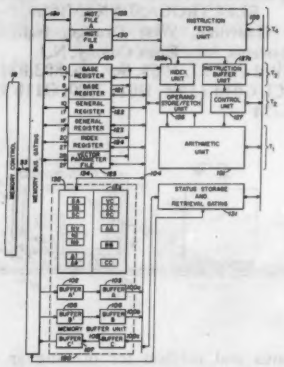
3,573,850
MULTIPLE SOCKET ASSEMBLY
Kenneth Wessel, White Plains, N.Y., assignor to Sealectro Corporation, Mamaroneck, N.Y.
Filed Oct. 22, 1969, Ser. No. 868,314
Int. Cl. H01r 23/02, 13/12
U.S. Cl. 339—157 6 Claims



A socket strip for miniature lamps with conductive pins extending downwardly therefrom. It comprises a plurality of sockets for the pins with flat soldering contacts extending from the bases of the sockets. The sockets are alternately mounted on two levels formed with superimposed decks, each having alternately arranged larger and smaller holes. The larger holes receive a socket on one deck, and the other hole receives the second pin from said lamp which passes into a socket positioned in the second deck.

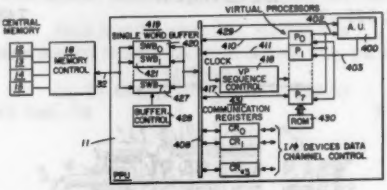
3,573,851
MEMORY BUFFER FOR VECTOR STREAMING
William J. Watson; William D. Kastner, and Thomas E. Cooper, Richardson, Tex., assignors to Texas Instruments, Incorporated, Dallas, Tex.
Filed July 11, 1968, Ser. No. 744,190
Int. Cl. G06f 9/00
U.S. Cl. 340—172.5 10 Claims

A data processing system is provided with a central processing unit with an arithmetic unit which is accessible from memory over two buffered channels and accessible to memory over one buffered channel. The central processing unit is provided with a program addressable register file for storage of machine language vector parameters. A common set of parameter and working storage registers is provided for



control of the buffered input and output channels and for control of the operation of the central processing unit. A control means is responsive to a program instruction for loading machine language vector parameters from the register file into the storage registers for the ordered handling of vector data by the central processing unit.

3,573,852
VARIABLE TIME SLOT ASSIGNMENT OF VIRTUAL PROCESSORS
William J. Watson, and Edwin H. Husband, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Aug. 30, 1968, Ser. No. 756,690
Int. Cl. G06f 7/38, 9/18
U.S. Cl. 340—172.5 8 Claims

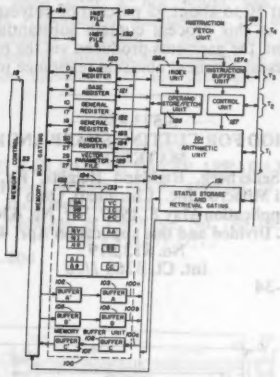


A peripheral processor supporting a central processor is provided with a plurality of virtual processors which utilize one arithmetic unit. A sequencer operating at clock rate assigns to the virtual processors time slots for utilization of the arithmetic unit. An addressable register stores codes representative of the virtual processors to permit either equal or preferential assignment of the time slots between the virtual processors.

3,573,853
LOOK-AHEAD CONTROL FOR OPERATION OF PROGRAM LOOPS
William J. Watson, and Thomas E. Cooper, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.
Filed Dec. 4, 1968, Ser. No. 780,980
Int. Cl. G06f 9/06
U.S. Cl. 340—172.5 5 Claims

A programmed computer look-ahead system is responsive to the presence in the instruction stream of a look-ahead instruction which is followed after a predetermined number of instructions by a conditional branch instruction. A decoder responds to the look-ahead instruction to establish

an index which is then changed an equal amount for each instruction processed. In response to a stored conditional branch instruction the operation returns to the instruction

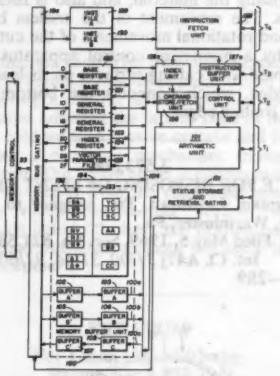


stream at the location of the stored look-ahead address when the index changes by an amount representative of the spacing along the instruction stream between the look-ahead instruction and conditional branch instruction.

3,573,854
LOOK-AHEAD CONTROL FOR OPERATION OF PROGRAM LOOPS

William J. Watson, and William D. Kastner, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 4, 1968, Ser. No. 781,071
Int. Cl. G06f 9/12
U.S. Cl. 340—172.5 **7 Claims**

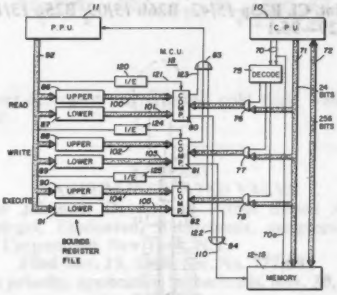


A look-ahead system for a digital computer is disclosed. This digital computer has programmed instructions stored in and retrievable from a memory. Instruction streams from the memory are passed seriatim through a plurality of instruction registers for processing the instructions. A preliminary decoder senses a look-ahead instruction in the instruction stream and a look-ahead counter responds to the decoding of a look-ahead instruction in the preliminary decoder to establish an index in the look-ahead counter. The index in the look-ahead counter is decremented upon the appearance of each subsequent instruction in the instruction stream at the preliminary decoder. There is a branch decoder which is operable in the instruction processing registers following the preliminary decoder for sensing the conditional branch instruction in the instruction stream. A present address register indicates a present address of the instruction to be processed through the instruction processing registers. A third decoder responds to the contents of the present address register to control the supply of instructions in series to the instruction registers. A branch register responds to predetermined conditions in the present address register and the index in the counter to establish in a look-ahead register an address in the memory for the look-ahead instruction in the instruction stream to control the repeat of the fetch of the look-ahead instruction from memory.

3,573,855
COMPUTER MEMORY PROTECTION

Harvey G. Cragon, Dallas, and William J. Watson, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 31, 1968, Ser. No. 788,166
Int. Cl. G06f 7/38
U.S. Cl. 340—172.5 **8 Claims**

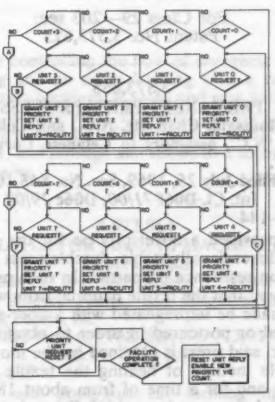


A data processing system is provided with a central processing unit with an arithmetic unit which is accessible to and from memory over buffered channels. The system is provided with registers for storage of upper and lower memory bounds for data to be read, data to be written and instructions to be fetched for execution. A comparison means is responsive to a request from memory for comparing each memory request with the bounds stored in the register file. The request from memory is enabled if the bounds comparison is satisfied, means being provided to elect internal or external bounds comparison.

3,573,856
DISTRIBUTED PRIORITY OF ACCESS TO A COMPUTER UNIT

Dennis R. Best, and William J. Watson, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed June 24, 1969, Ser. No. 836,071
Int. Cl. G06f 9/18
U.S. Cl. 340—172.5 **8 Claims**



Priority of access, as between a plurality of users, to a computer element such as a memory module is controlled by

establishing a fixed priority sequence and, in response to each completion of access to such module, shifting the starting point in said fixed priority sequence from one point to another in the sequence order.

ERRATA

For Classes 29—95.1 thru 280—150 see:
Patent Nos. 3,573,857 thru 3,573,885

3,573,857
RECIPROCATING CUTTING BLADE

George W. Sederberg, Highland Heights, Ky., assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Original application May 8, 1967, Ser. No. 636,965, now abandoned. Divided and this application Apr. 4, 1969, Ser. No. 813,518
Int. Cl. B23p *15/42*; B26b *13/00*; B25b *13/12*
U.S. Cl. 29—95.1 8 Claims

A material-cutting machine having a pair of endless bands, which are driven in unison, to advance material thereon longitudinally relative to a reciprocating cutting blade, which is supported be a fixed bridge of the cutting machine. The cutting blade is mounted for transverse movement through a transverse passage, which is formed between the endless bands supporting the material, and also is rotatable about a vertical axis. The movement of the endless bands and the transverse and rotational movements of the cutting blade are controlled by a numerical control apparatus. The cutting blade is formed with cutting surfaces on its leading edge and its lower edge, which connects the bottom ends of the leading and trailing edges.

ERRATUM

For Class 29—203 see:
Patent No. 3,573,625

3,573,858
PERMANENT PRESS PROCESS

Francis S. Moussalli, Charlotte, N.C., and Colin L. Browne, Charlotte, N.C., assignors to Celanese Corporation, New York, N.Y.

Filed July 25, 1969, Ser. No. 845,100
Int. Cl. D06f *71/00*; D06c *29/00*
U.S. Cl. 38—144 9 Claims

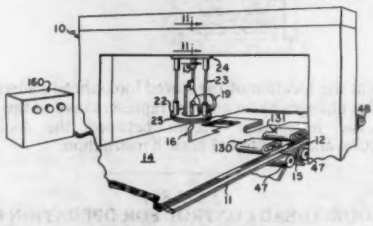
There is provided a novel process for the production of flat-drying, dimensionally stable, durable press garments with good abrasion resistance properties. In such process there is no requirement that the textile material from which said garments are made be impregnated with a fiber-setting reagent and precured or postcured in order to obtain a permanent press; rather, said press is obtained by the more economical and desirable method of heating the textile material to a temperature and for a time of from about 180° Fahrenheit for about 6 hours to about 440° Fahrenheit for about 1 second, cutting patterned pieces of fabric, sewing said pieces into a unitary shaped body, and pressing said shaped body for from about 10 to about 90 seconds at a head temperature of from about 300° to about 350° Fahrenheit and an air supply pressure of from about 20 to about 100 pounds per square inch.

This process works especially well with fabrics comprised of from about 50 to about 95 percent of polyester. Since the fabrics used in this process contain substantially no fiber-setting reagent, the garments produced via the process of this invention possess excellent abrasion resistance properties.

3,573,859
METHOD FOR CUTTING SHARP ANGLES IN MATERIAL

George W. Sederberg, Highland Heights, Ky., assignor to Cincinnatti Milacron Inc., Cincinnati, Ohio

Original application May 8, 1967, Ser. No. 636,965, now abandoned. Divided and this application Apr. 4, 1969, Ser. No. 813,519
Int. Cl. B26d *1/00*
U.S. Cl. 83—34 9 Claims

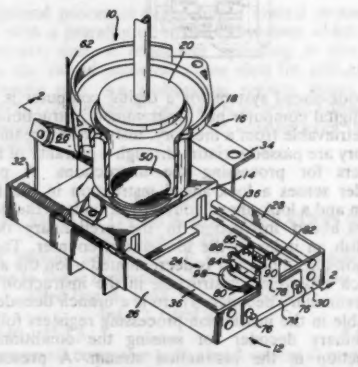


A material cutting machine having a pair of endless bands, which are driven in unison, to advance material thereon longitudinally relative to a reciprocating cutting blade, which is supported by a fixed bridge of the cutting machine. The cutting blade is mounted for transverse movement through a transverse passage, which is formed between the endless bands supporting the material, and also is rotatable about a vertical axis. The movement of the endless bands and the transverse and rotational movements of the cutting blade are controlled by a numerical control apparatus. The cutting blade is formed with cutting surfaces on its leading edge and its lower edge, which connects the bottom ends of the leading and trailing edges.

3,573,860
DEVICE FOR DISPOSING OF SPENT GROUNDS

Louis Bentzman, Levittown, Pa., assignor to The Pennstar Company, Warminster, Pa.

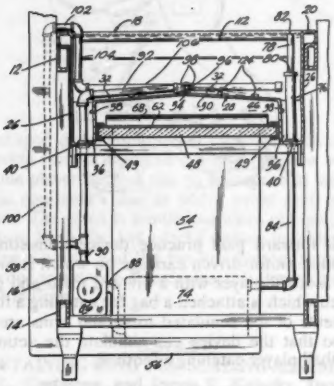
Filed May 5, 1969, Ser. No. 821,588
Int. Cl. A47j *31/00*, *31/44*, *31/60*
U.S. Cl. 99—289 6 Claims



Apparatus is provided for disposing of spent ground or powdered material used in beverage brewing machines. The

apparatus includes an ejector member which is automatically activated by a carriage containing spent powdered beverage producing material to eject such spent material. The ground or powdered beverage producing material expands and forms a cakelike mass after a hot liquid has been passed therethrough. Accordingly, substantially the entire cake of powdered material is ejected by the ejector member. The ejector member is automatically returned to its inoperative position upon movement of the carriage to the brewing station.

3,573,861
SELF-CLEANING FRYER APPARATUS
Dale S. Lecrone, Jackson, Mich., assignor to Dawn Donut Company, Inc., Jackson, Mich.
Filed Jan. 6, 1969, Ser. No. 789,165
Int. Cl. A47j *37/12*
U.S. Cl. 99—404 **7 Claims**



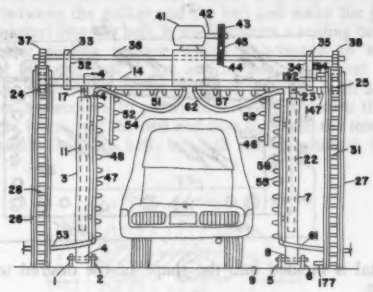
A high production food fryer utilizing a heated liquid, such as shortening, wherein frying takes place within an elongated receptacle having a central heating portion and elongated recessed portions adjacent the lateral sides of the receptacle which define cold wells to receive crumbs and food particles dropping from a conveyor mechanism transporting food through the fryer. The frying liquid is continuously circulated and includes an output from the circulating means disposed adjacent the receptacle heating portion whereby the circulated frying liquid "flushes" the heating portion free of crumbs and food particles, washing the same into the cold wells of the receptacle.

ERRATUM

For Class 128—2.05 see:
Patent No. 3,573,394

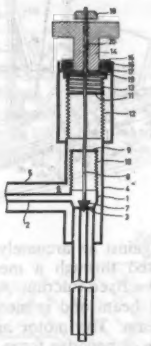
3,573,862
VEHICLE WASHING APPARATUS
William B. Brown, Rte. 1, Granby, Mo.
Filed Nov. 1, 1968, Ser. No. 772,778
Int. Cl. B08b *3/04*
U.S. Cl. 134—57 **3 Claims**

A pair of arcuate tracks mounted on a surface are provided. The sides and ends of the tracks define a vehicle washing position. The tracks substantially follow the top contour of the vehicle. A telescoping spray unit is operatively connected to the tracks and pivotally connected to the surface to provide a curtain of washing fluid substantially near and substantially normal to the vehicle surfaces. The spray unit substantially follows the top and side contours of the vehicle as the spray unit is moved back and forth over the vehicle. Hot wash water, cold rinse water and detergent supply means are provided. A timer operated, coin responsive, control means automatically moves the spray unit back and forth over the vehicle and sequentially supplies hot



wash water-detergent mixture and cold rinse water to the spray unit.

3,573,863
VACUUM-INSULATED VALVE
Bernardus Johannes Doors, and Petrus Simon Admiraal, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.
Filed Nov. 19, 1968, Ser. No. 777,081
Claims priority, application Netherlands, Nov. 30, 1967, 6716280
Int. Cl. F16k *27/00, 31/50*
U.S. Cl. 137—375 **5 Claims**

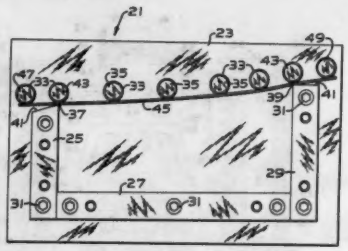


A valve for controlling the flow of cryogenic fluids has an inner housing and an outer housing with a vacuum space between the two housings, a valve and seat within the inner housing, and a valve stem extending outward through and sealed to a first bellows of the inner housing, through the vacuum space, and through and sealed to a second bellows of the outer housing.

3,573,864
APPARATUS FOR MAKING MACHINE TOOL TEMPLATES
Samuel I. Caldwell, Brinfield; Robert C. Greer, Pekin, and Russell E. Sherer, Peoria, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.
Filed Nov. 6, 1968, Ser. No. 773,915
Int. Cl. B41b *11/60*
U.S. Cl. 249—165 **5 Claims**

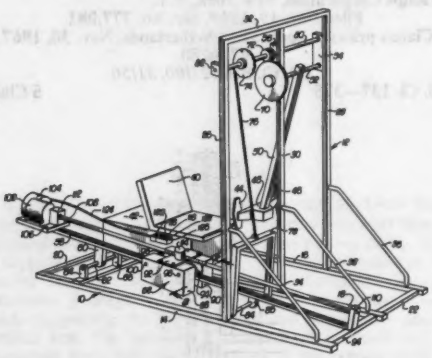
A method and apparatus for forming machine tool templates of plastic or ceramic materials by pouring such material, in a liquid state, into a compartment partially formed by a thin strip of sheet metal positioned by dowels

which are prepositioned in the bed of the mold. As the poured material solidifies, that portion adjacent the thin strip



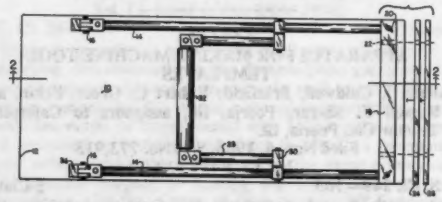
of metal is molded into the shape of the desired template surface.

3,573,865
WEIGHT SHIFTING MECHANISM FOR EXERCISING
William G. Annas, Sierra Madre, Calif., and William F. Hubner, Detroit, Mich., assignors to Paramount Health Equipment Corp., Los Angeles, Calif.
Filed Oct. 2, 1968, Ser. No. 764,390
Int. Cl. A63b *21/00, 23/00*
U.S. Cl. 272—81 **8 Claims**



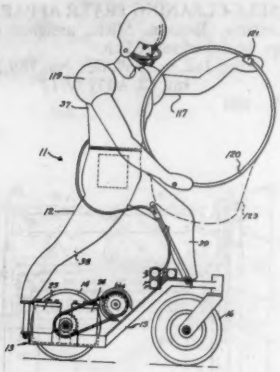
The user pushes against an arcuately movable pedal, the pedal being connected through a mechanism to pivot a weighted beam about a fixed fulcrum. A weight is guided for movement along the beam and is moved by a motor also supported on the beam. The motor and the beam are so mounted that positive or negative force bias can be imposed upon the object engaged by the user. A remote indicating means shows the position of the weight on the beam.

3,573,866
WEIGHT LIFT TYPE EXERCISING DEVICE
Billy D. Madden, 508 West 4th, Odessa, Tex. 79760
Filed May 28, 1969, Ser. No. 828,478
Int. Cl. A63b *21/20, 23/04, 23/07*
U.S. Cl. 272—81 **5 Claims**



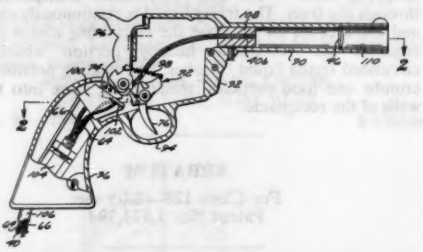
Weights pivoted by two weight bars to a flat board. The weights are detachably connected to the end terminals of the weight arms. A roll bar is pivoted to the weight arms by means of lift arms so that the roll bar may be positioned at different angles with the weight arms so as to accommodate different size persons.

3,573,867
MECHANICAL PASS RECEIVER
Audrey O. J. Mehrens, 1515 Avenue G, Rosenberg, Tex.
Filed July 1, 1969, Ser. No. 838,102
Int. Cl. A63h *11/00*
U.S. Cl. 273—55 **15 Claims**



A football forward pass practice device consisting of a radio-controlled motor-driven carriage on which is mounted a simulated football player with a pivoted torso and pivoted arms between which is attached a bag for catching a football. The movements of the simulated torso and arms are radio-controlled so that the device can simulate the action of a running football player catching a football.

3,573,868
FIBER OPTICAL TARGET PRACTICE SYSTEM
Carlo Giannetti, 2918 W. Ball Road, Anaheim, Calif.
Filed Nov. 13, 1967, Ser. No. 682,286
Int. Cl. F41j *5/00*
U.S. Cl. 273—101.1 **9 Claims**



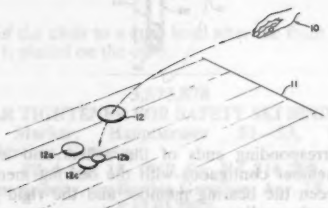
The specification of this application describes a target practice system which includes an optical arrangement by which light may be directed from a gun towards a target. The target includes a photosensitive means connected to initiate a scoring display system. The source of light for the gun is located at a point remote from the gun and light from the source is conveyed to the gun through a fiber optical conducting system. The source generates flashes of light in a gas tube which is fired by an electrical signal as an incident to alteration in light flux in an optical subsystem. The subsystem includes a second light source and fiber optic circuitry for conducting light from the second source through the gun and thence to light-sensitive circuitry in which the initiating pulse is generated. Means are provided within the gun for altering the light flow through the gun in response to actuation of the trigger mechanism. In the embodiment

described in detail in this specification, the initiating pulse is generated by the secondary optical system upon the occasion of interruption of light flow through the secondary fiber optical circuit.

3,573,869
PLAYING DISC WITH TACKY SURFACE

John W. Duckett, Tiburon, Calif., assignor to American Molded Products, Ltd., Sausalito, Calif.

Filed Mar. 26, 1969, Ser. No. 810,505
Int. Cl. A63b 65/00
U.S. Cl. 273—106 2 Claims

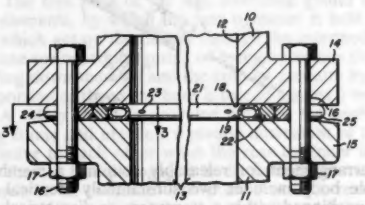


A packaged game comprises a plurality of flexible plastic discs having various sizes and colors. The game is played by having one player throw a disc to attempt to at least partially cover his opponent's disc in which event such player wins both discs. The game is terminated when one player wins all of the discs. Each disc has a tacky surface to better adhere to an opponent's disc, and flat top and bottom surfaces with a curved edge to provide an aerodynamic design for improved accuracy in flight.

3,573,870
RETAINING RING FOR SEALING ASSEMBLY

Robert L. Gastineau, and James E. Kalasky, Dayton, Ohio, assignors to United Aircraft Products, Inc., Dayton, Ohio

Filed Nov. 5, 1968, Ser. No. 773,402
Int. Cl. F16l 23/00
U.S. Cl. 277—11 2 Claims



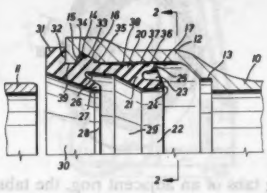
A retainer ring for use in a sealing assembly further comprising an O-ring seal, the retainer ring having a solid wirelike construction and being formed with peripheral lugs in the same plane which interfits with fastener bolts for positioning of the sealing assembly.

3,573,871
GASKET FOR BELL-TYPE PIPE JOINT

John A. Warner, Tyler, Tex., assignor to Tyler Pipe Industries, Inc., Tyler, Tex.

Filed Nov. 12, 1968, Ser. No. 774,782
Int. Cl. F16j 9/00; F16l 19/00
U.S. Cl. 277—168 5 Claims

A gasket preferably of rubber or other suitable elastomer for providing a seal and mechanical joint between the components of a telescoping-type joint such as customarily referred to as a bell-and-spigot-type joint or as a bell-type pipe joint. It is similar in some respects and in purpose to the gasket disclosed in U.S. Pat. No. 3,081,102, issued Mar. 12, 1963, for Gasket for Telescoping Joint, but has its exterior surface divided into two axially spaced sealing surfaces adapted to engage the interior of the bell, with a surface of slightly lesser diameter between them to partly relieve the friction between the gasket and the bell and make the gasket easier to insert into the bell. It also includes a sealing bead on the exterior sealing surface which is adapted to extend fartherest into the bell in use and so positioned that when being pushed into the bell it will tend to rotate such sealing surface in a direction to partly relieve the pressure thereof against the interior of the bell and thus facilitate the insertion of the gasket into the bell, but will inhibit rotation in the

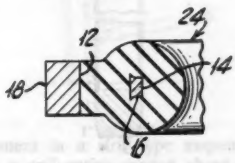


opposite direction to the original position and thereby strengthen certain of the seals. The reduction of the outer diameter of a part of the outer surface of the gasket facilitates such rotation of the sealing surface and relief of its pressure during insertion. The gasket also has a locking bead on the exterior sealing surface closest to the open end of the bell in use and this bead is joined to the portion of smaller exterior diameter by a tapered substantially conical portion which both makes it easier to start into the mouth of the bell during insertion and also makes it possible for this bead to lock into the locking grooves of various different shapes made by different pipe manufacturers without appreciable distortion.

3,573,872
SEALING WASHER

Harold A. Sannes, South Dartmouth, Mass., assignor to Acushnet Process Company

Filed July 3, 1968, Ser. No. 742,401
Int. Cl. F16j 15/00
U.S. Cl. 277—180 1 Claim



A composite sealing device is formed by molding a resilient ring on a coined portion of the inner diameter of a washer. A mechanical bond is formed by the ring material extending through holes at the outer periphery of the coined portion of the washer. The holes are of such diameter as to permit cold flow of metal into the holes from the coined portion of the washer without completely filling the void of the holes.

3,573,873
GUIDE AND COMPRESSION RING FOR GASKET INSERTS

Henry A. Pearson, 125 Cedarbrook Road, Ardmore, Pa. 19003

Filed Nov. 13, 1967, Ser. No. 682,207
Int. Cl. F16j 9/04
U.S. Cl. 277—203 24 Claims

A gasket assembly is provided, in which two annular rings are secured together with a replaceable gasket engaged therebetween, the gasket being of annular configuration and having an annular protruding peripheral portion at its radial

outermost edge of V-shape configuration, radial innermost edges of the rings being shaped together define a V-shaped configuration which, when the rings are clamped together, receive the annular V-shaped protrusion of the gasket therebetween, in clamped relation. Each ring is provided with axially bent tabs which are engageable with

corresponding tabs of an adjacent ring, the tabs of each pair of rings being complementally configured and being adapted for locking engagement upon pressing the rings together and providing relative rotation between the rings, preferably in a counterclockwise direction. The tabs may take on various forms and may be provided with interlocking means. An asbestos insert or the like may be provided between the two rings to provide compression of the ring assembly.

3,573,874

SEALING RINGS

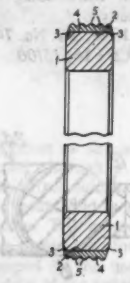
Harold T. Hill, and Ronald Morris Caton, Sway, England, assignors to Wellworthy Limited, Lymington, England

Filed Apr. 8, 1968, Ser. No. 719,447

Claims priority, application Great Britain, Apr. 12, 1967, 16880/67

Int. Cl. F16j *15/00; F02f 11/00*

U.S. Cl. 277—208 **5 Claims**



This specification discloses a sealing ring particularly a piston ring for an internal combustion engine, comprising a base ring, the outer periphery of which includes a generally plane cylindrical zone, and a coating of a wear resistant material provided on said zone. In the ring disclosed, the outer peripheral surface of the coating is provided with a plurality of axially spaced circumferentially extending lands.

3,573,875

SEAL FOR THE END FACES OF PARALLEL ROLLERS

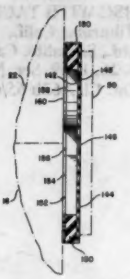
John F. Zuczek, Oakdale Village, N.J., assignor to Herbert Grodnick, Metuchen, fractional part interest to each and Martin Grodnick, Maplewood, N.J., fractional part interest to each

Original application July 26, 1966, Ser. No. 567,955, now Patent No. 3,421,164. Divided and this application Sept. 18, 1968, Ser. No. 760,506

Int. Cl. F16j *15/54*

U.S. Cl. 277—227 **4 Claims**

A seal for use in an apparatus in which a container is established by a plurality of rollers cooperating with one another to establish an axially extending cavity and a relatively rigid plate member urged toward the corresponding ends of the rollers, the seal including a flexible bearing member of low friction material providing a sealing surface



at the corresponding ends of the rollers and a resilient backing member contiguous with the bearing member and lying between the bearing member and the rigid plate for maintaining the sealing surface in sealing engagement at the ends of the rollers.

3,573,876

ARRANGEMENT FOR RELEASABLY COUPLING A MEMBER TO A ROTATABLE BODY

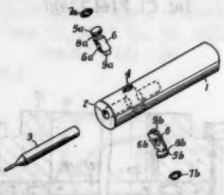
John William Powell, Little Acres Ballards Close, Lytchett Matravers, Poole Dorset, England

Filed Dec. 27, 1968, Ser. No. 787,512

Claims priority, application Great Britain, Jan. 11, 1968, 1712/68

Int. Cl. B23b *31/14*

U.S. Cl. 279—1 **6 Claims**



An arrangement for releasably coupling a member to a rotatable body includes two substantially identical locking pieces positioned within a transverse or diametrical bore of the rotatable body and connected together by O-rings such that they can move transversely of the body in opposite directions; with respect to each other. On rotation of the body, the locking pieces move apart under centrifugal force, their ends extending beyond the surface of the body to engage a member mounted on the body. Alternatively, the body is provided with an axial bore and the locking pieces have holes alignable with the bore to accommodate the shank of a tool. Rotation of the body causes the locking pieces to move apart, the edges of their holes gripping the shank of the tool.

3,573,877

CURB-CLIMBING ATTACHMENT FOR WHEEL CHAIRS

Burton H. Locke, 6545 Wilbur Ave, Spc. 84, Reseda, Calif. 91335

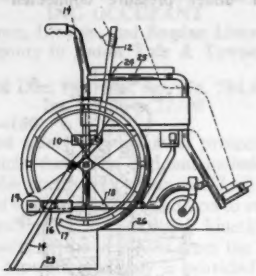
Filed May 19, 1969, Ser. No. 825,913

Int. Cl. B62b *5/02*

U.S. Cl. 280—5.32 **2 Claims**

Curb-Climbing Structure added to wheel chairs with lifting

means to be actuated by the occupant of the chair to raise



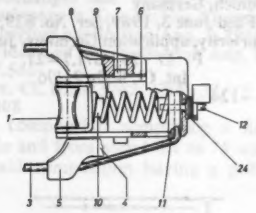
the rear of the chair to a curb level after the front portion of the chair is placed on the curb.

3,573,878

REAR TIGHTENER FOR SAFETY SKI BINDINGS

Hannes Marker, Hauptstrasse 51—53, Garmisch-Partenkirchen, Germany

Filed Apr. 15, 1969, Ser. No. 816,289
Claims priority, application Germany, Apr. 19, 1968, P 17 03 225.6
Int. Cl. A63c *9/08*
U.S. Cl. 280—11.35 **7 Claims**



A skiing boot pusher is disposed substantially between the legs of a U- or V-shaped retaining frame and is held on the same for pivotal movement about an axis which is transverse to the longitudinal axis of the ski and parallel to the tread of the ski. The free ends of the legs constitute guides for two tension elements, by which the rear tightener is held on the ski and which act on the pusher through the intermediary of at least one spring, which spring or springs produce the force for holding down the heel and the contact pressure by which the toe portion of the skiing boot is forced against a retaining device. A safety clutch is provided between the pusher and retaining frame and prevents a pivotal movement of the two parts relative to each other when the rear tightener is ready for use whereas it is disengaged to disconnect the two parts in response to an overload. The pusher extends rearwardly beyond the axis on which it is pivoted to the retaining frame and forms a two-armed lever having a forward arm which has a free end engageable with the heel of the boot. The other arm of the lever forms a guide which extends in the longitudinal direction of the lever and is in guiding engagement with a slider, to which the tension elements are connected. Each spring has one end bearing on the slider and another end bearing on a fixed part of the pusher. The clutch member carried by the pusher consists of a pin, which is mounted in the slider. The clutch member carried by the retaining frame consists of a locking member, which can be arbitrarily released.

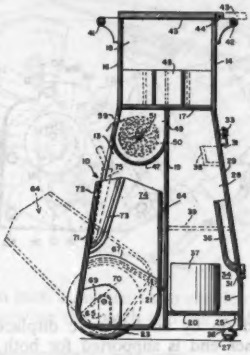
3,573,879

CART FOR CLEANING IMPLEMENTS

Robert L. Bergkamp, and Helen Gerber Bergkamp, RR 2, Cheney, Kans. 67025

Filed June 6, 1969, Ser. No. 831,028
Int. Cl. B62b *1/12*
U.S. Cl. 280—47.19 **7 Claims**

A cart for conveniently storing and transporting all of the implements and other items required for cleaning homes, office buildings, hospitals and the like, which is so constructed that it can be conveniently conveyed up or down stairs, which normally assumes a substantially upright position with all of the contents thereof readily accessible,



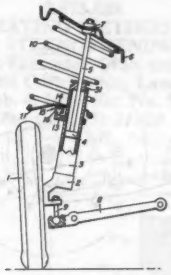
and which includes a receptacle which may be readily swung outwardly to an open position to receive trash and other refuse to be disposed of and which is capable of being readily removed from the cart for emptying the contents thereof.

3,573,880

FRONT WHEEL SUSPENSION FOR MOTOR VEHICLE

Yasuyuki Sakai, Tokyo, Japan, assignor to Nissan Jidosha Kabushiki Kaisha, Kanagawa-Ken, Japan

Filed Oct. 18, 1968, Ser. No. 768,639
Claims priority, application Japan, Oct. 28, 1967, 42/69260;42/69261;42/91270
Int. Cl. B60g *3/06, 15/06*
U.S. Cl. 280—96.2 **15 Claims**



An improvement in a strut-type suspension for motor vehicle having a coil spring placed about a cylinder and piston assembly, wherein the lower end of the coil spring and a spring seat rotate eccentrically around the cylinder and piston assembly when the vehicle is steered. The coil spring is pressed onto the vehicle frame at the upper end thereof and on the spring seat at the lower end thereof, and the cylinder and piston rod assembly extends eccentrically through said coil spring. The spring is provided for supporting said coil spring. Said seat being mounted on said cylinder and piston for eccentric rotation about said assembly.

3,573,881

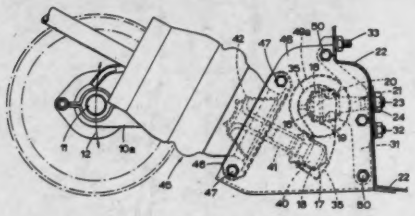
MOTOR VEHICLE SUSPENSION SYSTEMS

Charles Arthur Griffin, Barnet Green, England, assignor to Moulton Developments Limited, Bradford-on-Avon, England

Filed Mar. 7, 1969, Ser. No. 805,176
Claims priority, application Great Britain, Mar. 14, 1968, 12,450/68
Int. Cl. B60g *11/26*
U.S. Cl. 280—96.2 **4 Claims**

This invention provides for an automotive vehicle a suspension arrangement with a trailing or semitrailing arm

controlled by an hydraulic displacer unit, in which the trailing arm has at the outer end of its leading part, a flexible mounting allowing both pivotal and compliance movement to the arm, and at the inner end of the leading part, a depending



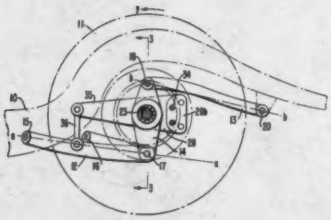
crank arm acted on by an hydraulic displacer unit, and wherein said inner end is supported for both pivotal and compliance movement by a knuckle-type bearing situated so that its center lies in the vertical plane of thrust of the hydraulic displacer unit.

3,573,882

AXLE SUSPENSION, ESPECIALLY FOR THE REAR AXLE OF MOTOR VEHICLES

Friedrich H. Van Winsen, Kirchheim Teck, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Aug. 16, 1968, Ser. No. 753,284
Claims priority, application Germany, Aug. 16, 1967, D53,864
Int. Cl. B60g *3/00*
U.S. Cl. 280—124 **16 Claims**



An axle suspension, especially for the rear axle of motor vehicles in which two oppositely directed longitudinal guide members are pivotally connected with the wheel carrier serving as coupler member while a brake stator is pivotally supported on the forwardly extending guide member; the free ends of the longitudinal guide members are so pivotally connected at the vehicle superstructure that the straight lines extending through their joint axes intersect to the rear of the rear axle, and preferably at a point located to the rear thereof by at least one wheel diameter.

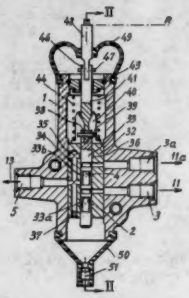
3,573,883

DEVICES FOR THE VERTICAL ADJUSTMENT OF THE BODIES OF AUTOMOTIVE OR OTHER VEHICLES

Jean Georges Cadiou, Paris, France, assignor to Societe Anonyme Automobiles Citroen, Paris, France

Filed Nov. 27, 1968, Ser. No. 779,661
Claims priority, application France, Dec. 7, 1967, 131,384
Int. Cl. B60g *17/00*
U.S. Cl. 280—124 **3 Claims**

An adjustment valve for a vertical adjustment device of automotive or other vehicles comprising at the front and rear ends suspensions provided with vertical correctors and accumulators supplied with fluid under pressure by means of a distributor under pressure connected to said valve



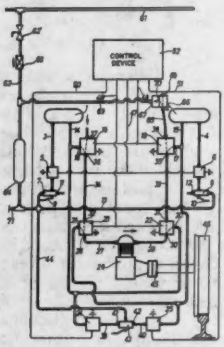
comprising a slide-valve piston and communicating with a fluid reservoir.

3,573,884

AIR BELLOWS SUSPENSION SYSTEM FOR VEHICLES

Hans Pollinger, Munich, Germany, assignor to Knorr-Bremse GmbH, Munich, Germany

Filed June 3, 1969, Ser. No. 829,973
Claims priority, application Germany, June 7, 1968, P 17 55 671.7—21
Int. Cl. B60g *21/06*
U.S. Cl. 280—124 **3 Claims**



A vehicle having an air supply conduit therethrough has pneumatic bellows supporting both sides of the vehicle body. An axle-driven compressor pumps air from one bellows to another depending on the direction of the curved path the vehicle is travelling. An air supply reservoir is connected through a check valve to the air supply conduit and to the bellows. A pressure regulator is connected to the compressor discharge and to the air reservoir. A valve system connects the compressor intake and discharge to the bellows on both sides of the vehicle when the vehicle travels along a curved path to pump air from the bellows on the inside of a curve to the bellows on the outside of a curve. When the vehicle travels along a straight path air is pumped to the air supply reservoir whose maximum filled pressure is greater than the pressure in the air supply conduit. In response to the maximum filled pressure of the reservoir the pressure regulator will connect the compressor discharge to the atmosphere so that air is pumped to the atmosphere after the reservoir has been filled.

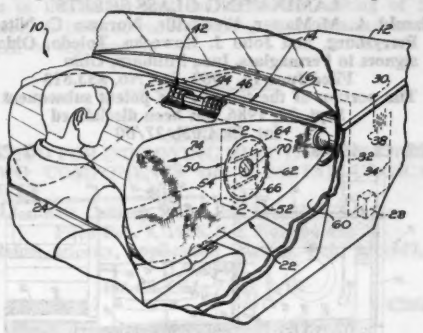
3,573,885

VEHICLE SAFETY APPARATUS FOR RESTRAINING OCCUPANT

Darrell S. Brawn, Livonia, and Bogdan Lisowsky, Detroit, Mich., assignors to Eaton Yale & Towne Inc., Cleveland, Ohio

Filed Dec. 18, 1968, Ser. No. 784,623
Int. Cl. B60r 21/08
U.S. Cl. 280—150 18 Claims

An improved safety apparatus for protecting an occupant of a vehicle during an accident includes a confinement. Upon the occurrence of an accident, the confinement is inflated to an expanded condition to restrain movement of the occupant by absorbing kinetic energy. To minimize rebound of the occupant from the confinement, an exhaust or blowout assembly is provided for dissipating the absorbed kinetic energy by enabling fluid to be discharged from the confinement. The exhaust or blowout assembly includes a patch which is ruptured or blown out of a blocking relationship with an aperture or opening in the confinement by fluid pressure. To preserve the integrity of the exhaust assembly until a predetermined fluid pressure is present within the confinement, the patch is



mounted in such a manner as to enable relative movement to occur between the patch and the confinement.

CHEMICAL

3,573,886

RARE-EARTH OXIDE AND WOLLASTONITE POLISHING COMPOSITION

Nicholas J. Goetzinger and Walter L. Silvernail, West Chicago, Ill., assignors to Kerr McGee Chemical Corp.

No Drawing. Original application Aug. 2, 1965, Ser. No. 476,753. Divided and this application Aug. 19, 1968, Ser. No. 767,556
Int. Cl. B24d 3/02; C04b 31/16
U.S. Cl. 51—308 2 Claims

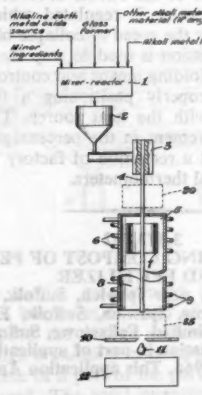
A polishing composition comprising a finely divided rare earth oxide and from about 0.1 to 75 weight percent wollastonite, said composition having a polishing speed in excess of 9.

3,573,887

METHOD OF MAKING GLASS FROM REACTED AND SHAPED BATCH MATERIALS

William A. Mod and Donald L. Caldwell, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 27, 1968, Ser. No. 708,673
Int. Cl. C03b 1/00
U.S. Cl. 65—18 11 Claims



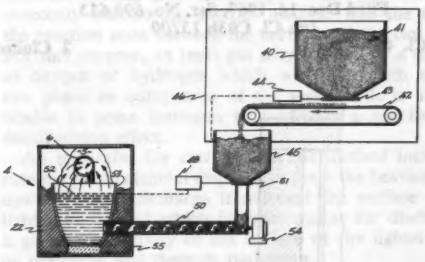
This specification discloses a continuous, batch or semi-batch process for making glass and particularly but not limited to so-called soda-lime glass comprising in a continuous manner preparing a substantially reacted glass making batch wherein an alkali metal hydroxide is employed as a constituent thereof to provide a source of at least 50 percent of the alkali metal flux values in the final glass, forming said batch into a continuous or discontinuous elongated shape, drying said batch so-elongated, and thereafter passing the dried rigid shaped batch into a high temperature zone to rapidly and continuously melt the elongated batch and fine it. The molten glass so made can be solidified or worked into a useful configuration.

3,573,888

VAPOR OVERHEATING METHOD AND APPARATUS FOR STRENGTHENING GLASS

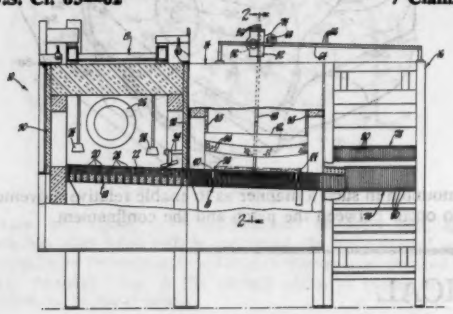
Burton S. Bogart, Lancaster, Ohio, assignor to Anchor Hocking Glass Corporation, Lancaster, Ohio

Filed Feb. 6, 1968, Ser. No. 703,455
Int. Cl. C03c 21/00
U.S. Cl. 65—30 14 Claims



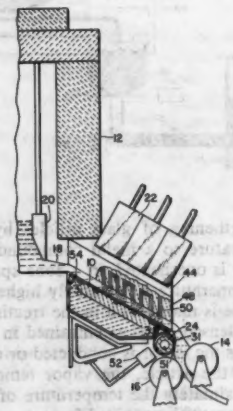
In the strengthening of glass articles by exposure at elevated temperature to a metal compound in the vapor state, the vapor is overheated, in a zone spaced from the article, to a temperature substantially higher than that at which the article is maintained in the treating zone. Non-gaseous or condensed droplets entrained in the vapor are removed, and as the vapor is conducted or circulated into proximity with the article, the vapor temperature is reduced to approximately the temperature of the article to be treated. Apparatus is provided for automatically charging a source of the metal compound to a zone separate from the treating furnace, vaporizing it and overheating the vapor, conveying the vapor at controlled temperature and discharging it into the treating zone.

3,573,889
METHOD FOR SHAPING, TEMPERING AND LAMINATING GLASS SHEETS
Harold A. McMaster, Woodville, Norman C. Nitschke, Perrysburg, and John J. Kawecka, Toledo, Ohio, assignors to Permaglass, Inc., Millbury, Ohio
Filed June 16, 1969, Ser. No. 833,813
The portion of the term of the patent subsequent to Sept. 23, 1986, has been disclaimed
Int. Cl. C03b *27/00*
U.S. Cl. 65—62 7 Claims



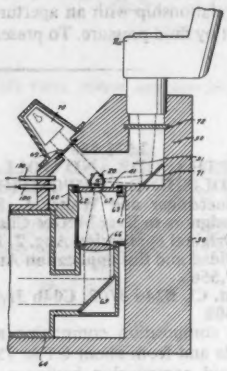
A method for making a tempered laminated window wherein a first sheet of glass is supported on fluid and heated to a temperature sufficient for deforming and tempering and thereafter lifted with an endless ring frame to force the sheet into engagement with a shaped surface. The sheet of glass is then tempered or cooled while supported on the frame. A second sheet is shaped with the exact same frame so that it has the same shape as the first sheet. The two tempered sheets of glass are then laminated. The laminating of the two tempered sheets of glass is possible because they are both supported and shaped by the same shaping frame and are cooled to rigidity before being removed from the shaping frame so that they are substantially exact duplicates.

3,573,890
HEATED DELIVERY SYSTEM FOR SHEET GLASS
Allen C. Ihrig, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.
Filed Dec. 14, 1967, Ser. No. 690,613
Int. Cl. C03b *13/00*
U.S. Cl. 65—90 2 Claims



A system for delivering a sheet of molten glass from a forehearth. The system includes a channel having as its base a downwardly inclined platinum-lined delivery lip with heated side portions and having an internally heated platinum tube at its discharge end. A plurality of burners direct heat to glass in the vicinity of the delivery lip, and a row of radiant heaters below the platinum tube and its glass discharge side heat the tube to minimize heat loss from beneath. Additional heaters are located in the sidewalls of the channel.

3,573,891
METHOD OF FORMING A THERMOMETER CONSTRICTION AND APPARATUS THEREFOR
Waldemar A. Ayres, Rutherford, N.J., assignor to Becton, Dickinson and Company, East Rutherford, N.J.
Filed Apr. 1, 1968, Ser. No. 717,821
Int. Cl. C03b *23/10*
U.S. Cl. 65—110 10 Claims



A method and apparatus for collapsing the bubble in the bore of a thermomenter blank to form a constriction therein in the manufacture of clinical thermometers. The thermometer is positioned within a pressurized chamber and is subjected to localized heating by means of a heat source such as a gas burner or a laser, at the location of the bubble. Control means are provided to regulate the length of time the bubble is subjected to heat thereby providing a method of regulating the amount of collapse of the bubble in forming the constriction. The air pressure is regulated which provides additional control over the speed of collapse of the bubble and sudden decompression is used to stop the collapse at the proper moment. Holding means and control means are also provided for properly positioning a thermometer blank in alignment with the heat source. The result is a considerable improvement in the percentage of acceptable constrictions and a reduction of factory costs in the manufacture of clinical thermometers.

3,573,892
PROPAGATING COMPOST OF PEAT AND FERTILIZER
Peter Samuel Atkins, near Ipswich, Suffolk, and Derek Charles Attenburrow, Ipswich, Suffolk, England, assignors to Fisons Limited, Felixstowe, Suffolk, England
No Drawing. Continuation-in-part of application Ser. No. 563,993, July 11, 1966. This application Apr. 23, 1968, Ser. No. 723,570
Claims priority, application Great Britain, July 23, 1965, 31,453/65
Int. Cl. C05f *11/02*
U.S. Cl. 71—24 5 Claims

A superior propagating compost is provided which is substantially free from sand or soil, which contains a total

of at least 60% by weight of water based on the dry weight of the components, and which compost comprises a milled peat in admixture with a fertilizer base, optionally in admixture with a bulking or carrier material for the fertilizer base, the mixture having a pH value in the range 5.5 to 7.0; the milled peat being characterized in that it is a free flowing particulate peat all of whose particles pass through a ⅜ inch sieve aperture, less than 7% passing through a No. 60 BSS. sieve and in that it contains not less than 30% by volume of particles having a density greater than that of a petroleum ether having a boiling point in the range 80–100° C. at 760 mm. of mercury.

3,573,893

FERTILIZER FOR CEREALS AND PROCESS FOR ITS MANUFACTURE

Bengt Wadsted, Copenhagen, Denmark, assignor to Marden Anstalt, Vaduz, Liechtenstein

No Drawing. Filed Apr. 15, 1968, Ser. No. 721,166
Claims priority, application Sweden, Apr. 28, 1967, 6,124/67; Dec. 8, 1967, 16,925/67
Int. Cl. C05b *1/00*
U.S. Cl. 71—41 **14 Claims**

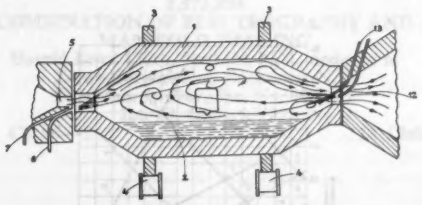
Fertilizer composition and process of producing same wherein phosphoric acid is treated with ground dolomite, the reaction product being further treated with a selectively calcined dolomite which is either unslaked selectively calcined dolomite or slaked selectively calcined dolomite, and thereafter the reaction mass thus-obtained is treated with a product containing at least one potassium salt selected from the group consisting of potassium chloride and potassium sulfate.

3,573,894

PROCESS AND PLANT FOR REDUCING METALLIC OXIDES

Pierre Marie Francois Fourt, 15 ter Avenue Clodoald, Saint-Cloud, Hauts-de-Seine, France

Continuation-in-part of abandoned application Ser. No. 532,719, Mar. 8, 1966. This application June 14, 1968, Ser. No. 753,817
Claims priority, application France, Mar. 18, 1965, 9,764
Int. Cl. C21b *11/06*
U.S. Cl. 75—20 **2 Claims**



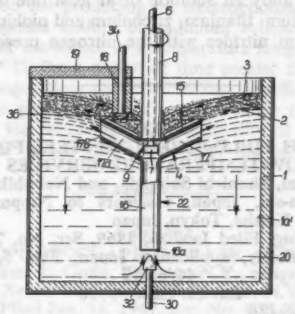
Metallic oxides are reduced in a rotating furnace heated by a burner at one end of the furnace producing a flame above the charge with oxygen blown into the flame through a plurality of nozzles and with introduction into the flame of a part of the particles of metallic oxides to be reduced. The total quantity of oxygen added to the flame is insufficient for complete combustion of the combustible materials emerging from the burner so as to maintain a reducing zone adjacent the burner. The remainder of the metallic oxides to be reduced are introduced at the other end of the furnace and additional oxygen is supplied adjacent the smoke outlet at the other end of the furnace for oxidation of the reducing gases in the smoke and for additional heating of the furnace. A bath of reduced metal is maintained in the bottom of the furnace.

3,573,895

METHOD FOR IMPROVING REACTIONS BETWEEN TWO COMPONENTS OF A METALLURGICAL MELT

Jan-Erik Östberg, Torps Sateri, Bettna, Sweden

Filed Feb. 9, 1968, Ser. No. 704,458
Claims priority, application Sweden, Feb. 9, 1967, 1,800/67
Int. Cl. C21c *7/00, 7/02*
U.S. Cl. 75—59 **8 Claims**



A method of improving the reaction between two components of different specific gravity or for homogenizing mixtures of components of different specific weight at least one of which is a fluid such as between a metallurgical melt and a slag layer, comprises producing a flow in the reaction zone between the two liquids of different specific gravities or specific weight and simultaneously introducing gaseous medium into the area of the reaction zone between the surfaces of the two layers. For this purpose, an inert gas may be used or a gas such as oxygen or hydrogen which will react with at least one phase or component of the mixture. It is also desirable in some instances to introduce a gas having a desulfurizing effect.

An apparatus for carrying out the method includes a rotating pump element disposed to draw the heavier liquid upwardly and discharge it adjacent the surface of the lighter liquid and which includes means for discharging a gas in the vicinity of the surface of the lighter liquid or upwardly and through the pump.

3,573,896

WET PROCESS FOR MANUFACTURING METALLIC COPPER

Shoichiro Hori, 291 Yukigaya, Ota-ku, Tokyo, Japan, and Taijiro Okabe, 1–196 Kitasagigamori, Aramaki, Sendai-shi, Japan

No Drawing. Filed June 10, 1968, Ser. No. 735,572
Int. Cl. C22b *9/02, 9/04, 15/08*
U.S. Cl. 75—117 **7 Claims**

The process of manufacturing copper and sulfate salts of sodium, of potassium, of magnesium or of calcium, obtained as by-products, by reacting at least one copper compound, such as copper sulfate, copper carbonate,

copper oxide or basic copper salts of these compounds with salts of sodium, or of potassium, or of magnesium or of calcium which produce sulfite ions or hydrogen sulfite ions in the water solution, by heating in the presence of water.

3,573,897

IRON-NICKEL ALLOYS HAVING A HIGH NICKEL CONTENT

Xavier Wache, Sauvigny-les-Bois, France, assignor to Société des Forges et Ateliers du Creusot, Paris, France

Original application July 11, 1967, Ser. No. 652,484. Divided and this application Dec. 16, 1969, Ser. No. 885,502
Claims priority, application France, July 12, 1966, 69,164
Int. Cl. C22c *39/40, 39/50, 39/54*
U.S. Cl. 75—123 2 Claims

The weldability of iron-nickel alloys with a nickel content higher than 30% in weight is improved by introducing into the alloy an addition of at least one of the elements vanadium, titanium, zirconium and niobium. These elements form nitrides with the nitrogen present in the alloy.

3,573,898

HIGH YIELD-STRENGTH STEEL FOR LOW-TEMPERATURE SERVICES

Shigeki Murai, Shunichi Shimada, and Nobuhiko Nakao, Yokohama-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

No Drawing. Filed Jan. 31, 1969, Ser. No. 795,705
Claims priority, application Japan, Feb. 5, 1969, 44/6,710
Int. Cl. C22c *39/20*
U.S. Cl. 75—124 4 Claims

High-yield-strength steel for low-temperature services, consisting essentially of 0.01 to 0.20% C, 0.10 to 0.60% Si, 1.00 to 1.50% Mn, 0.10 to 0.30% Cu, 0.10 to 0.40% Cr, 0.020 to 0.060% Sol Al, 0.008 to 0.020% N and the balance being Fe and unavoidable impurities, said steel having high tensile-strength of more than 50 kg./mm.^{2}, highly yield-strength of more than 35 kg./mm.^{2}, excellent low-temperature toughness and good weldability.

3,573,899

AUSTENITIC STAINLESS STEEL AND METHOD

Roland E. Groethe, Washington, Pa., assignor to Jessop Steel Company, Washington, Pa.

No Drawing. Filed Apr. 17, 1968, Ser. No. 721,932
Int. Cl. C22c *39/20*
U.S. Cl. 75—128 4 Claims

A chromium-nickel-molybdenum austenitic stainless steel, primarily for superior corrosion resistance for special applications such as in the chemical and process industries, has been obtained by initial forging (rolling) of the same only between critical temperatures of 2050° to 2200° F., when said novel stainless steel has essentially the following composition on weight basis:

	Percent
Chromium	20.00 to 23.00
Nickel	23.00 to 26.00
Molybdenum	4.00 to 5.00
Silicon (maximum)	1.00
Manganese (maximum)	2.00
Columbium	0.20 to 0.40
Carbon (maximum)	0.04
Iron	Balance

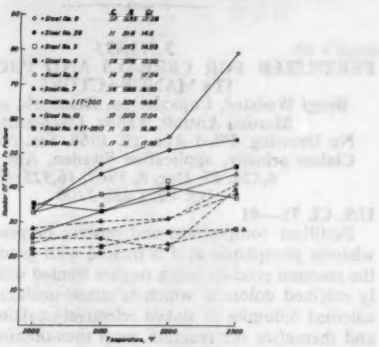
An annealing step is not required to avoid intergranular corrosion in welding the novel alloy. The novel alloy can be employed in chemical apparatus used, for example in wet phosphoric acid processes.

3,573,900

META-STABLE AUSTENITIC STAINLESS STEELS OF IMPROVED HOT WORKABILITY

Kenneth G. Brickner, Wilkinsburg Borough, and David C. Ludwigson, Hempfield Township, Westmoreland County, Pa., assignors to United States Steel Corporation

Continuation-in-part of application Ser. No. 378,932, June 29, 1964. This application July 19, 1968, Ser. No. 746,138
Int. Cl. C22c *39/20, 39/26*
U.S. Cl. 75—128 3 Claims



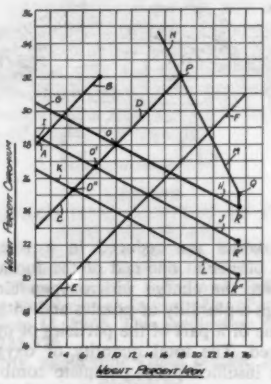
Chromium-manganese-nickel stainless steels of low, controlled nitrogen content having a predominantly austenitic structure as heat treated, and partially transformable to martensite on cold working, and possessing improved hot workabiilty together with good corrosion resistance.

3,573,901

ALLOYS RESISTANT TO STRESS-CORROSION CRACKING IN LEADED HIGH PURITY WATER

George Economy, Monsey, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of abandoned application Ser. No. 653,665, July 17, 1967. This application July 10, 1968, Ser. No. 743,674
Int. Cl. C22c *19/00*
U.S. Cl. 75—171 39 Claims



A high nickel alloy containing substantial but controlled amounts of chromium, e.g., 28%, and advanta-

geously iron, having improved resistance to stress-corrosion cracking when used in high purity water environments contaminated by lead. Iron is beneficial, particularly in minimizing scale formation. Other constituents can be utilized to advantage, including columbium, molybdenum, vanadium, and tungsten.

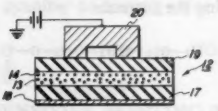
3,573,902
YTTRIUM-CONTAINING WELDING ALLOYS
Eugene J. Delgrosso, 1468 Tuttle Ave., Wallingford, Conn. 06492
Filed Mar. 10, 1967, Ser. No. 623,184
Int. Cl. C22c *27/00*
U.S. Cl. 75—174 4 Claims

An yttrium-containing alloy for welding filler rods to be used in welding and joining reactive-refractory metal alloy substrates. The alloy is created by nonconsumable arc-melting and contains from 1 to 6% by weight of *retained* yttrium with the balance consisting essentially of one or more of the reactive-refractory metals, including titanium, zirconium, and the refractory metals. The alloy is particularly effective in preventing and reducing oxygen contamination of weldments and substrates during high-temperature welding of reactive-refractory metal alloys under field of less-than-ideal conditions.

3,573,903
DUCTILE HIGH TEMPERATURE TUNGSTEN-RHENIUM ALLOY AND PROCESS FOR MAKING SAME
Eugene J. Delgrosso, Wallingford, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.
No Drawing. Filed July 21, 1964, Ser. No. 385,101
Int. Cl. C22c *27/00*
U.S. Cl. 75—176 11 Claims

A novel ductile high-temperature tungsten-base alloy containing 3 to 20% rhenium and .05 to 3.0% yttrium or mixtures of yttrium and cerium is made by compacting powders of the ingredient elements, heating the compact at an intermediate temperature well below the compact's sintering temperature in a hydrogen atmosphere to effect removal of interstitials, and then sintering the compact in a dynamic vacuum.

3,573,904
COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING
Harold Ernst Clark, Penfield, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed Jan. 9, 1967, Ser. No. 608,157
Int. Cl. G03g *13/22*
U.S. Cl. 96—1 14 Claims



An imaging process wherein an imaging layer structurally fracturable in response to the combined effect of an applied electrical field and exposure to actinic electromagnetic radiation is sandwiched between a donor sheet and a receiver at least one of the sheets being at least partially transparent to the actinic electromagnetic radiation. The sandwich is subjected to an imagewise electric field while the imaging layer is uniformly exposed to actinic electromagnetic radiation. Upon separation of the donor sheet and receiver sheet, the imaging layer fractures in imagewise configuration providing a negative image on one of the sheets and a positive image on the other.

3,573,905
METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%
Katsuo Makino and Iwao Sawato, Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Kanagawa, Japan
Filed June 10, 1966, Ser. No. 556,648
Claims priority, application Japan, June 11, 1965, 40/34,320
Int. Cl. C01f *7/70, 7/72, 7/74*
U.S. Cl. 96—1.5 8 Claims

A method for producing an electrophotosensitive material composed mainly of cadmium sulfide by heating a powder of the sulfide in a temperature range from 100° C. to 500° C. for a period of time greater than 2 hours but not longer than 48 hours so that the dimensions of the powder particles do not become larger than 1.5 microns and the percentage of hexagonality of the crystalline powder is less than 80% after the period of heat treatment.

3,573,906
ELECTROPHOTOGRAPHIC PLATE AND PROCESS
William L. Goffe, Webster, N.Y., assignor to Xerox Corporation, Rochester, N.Y.
Filed Jan. 11, 1967, Ser. No. 608,606
Int. Cl. G03g *5/06, 5/08, 13/22*
U.S. Cl. 96—1.8 15 Claims

An electrophotographic plate and imaging process are disclosed. The plate comprises a conductive substrate coated with a thick organic insulating layer overcoated with a thin photoconductive layer. Images may be formed by electrostatically charging the plate, exposing it to an image and developing with electroscopic marking material.

3,573,907
PROCESS FOR MAKING ETCHING RESISTS AND PHOTOGRAPHIC STRIPPING FILM FOR USE IN SUCH PROCESS
Johan Lodewijk Verelst and Albert August Reyniers, Kontich, Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium
No Drawing. Filed Dec. 9, 1966, Ser. No. 600,375
Claims priority, application Great Britain, Dec. 9, 1965, 52,372/65
Int. Cl. G03c *1/90, 11/12*
U.S. Cl. 96—28 13 Claims

An etching resist on a metallic surface to be etched is produced by means of a photographic stripping film which includes directly attached to the film support a layer essentially consisting of hydrophilic colloid and a synthetic polymeric material which has been mixed as a latex with the hydrophilic colloid, which layer is at least water-permeable, if not warm water soluble. After the film is exposed and a hardened relief image is produced, the metallic surface is wet with a liquid which has a swelling action for hydrophilic colloids less than that of pure water. The film is applied to the wet metal surface, the film support is removed by stripping and the remainder of the film is developed to produce a hardened, water-insoluble relief image which is then finally dried. In one embodiment an unhardened, light-sensitive layer, soluble in warm water, is provided on a separate colloid-latex layer, the

light-sensitive layer being adapted to form a hardened water-insoluble relief image, there being no anchor remaining insoluble in warm water formed between the light-sensitive layer when in hardened condition and the colloid-latex layer, at least if the latter layer is insoluble in warm water. In another embodiment, the colloid-latex layer itself constitutes the unhardened, warm water soluble light-sensitive layer adapted to form a hardened, water-insoluble relief image. Preferably, the ratio of the synthetic polymeric material to the hydrophilic colloid, is between about 1:1 and 6:1.

3,573,908

PHOTOGRAPHIC TECHNIQUE FOR THE SELECTIVE DEPOSITION OF A CERAMIC SUBSTRATE GLAZE

Richard H. Minetti, Westfield, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

No Drawing. Filed June 6, 1969, Ser. No. 831,250
Int. Cl. G03c 7/00
U.S. Cl. 96—34 4 Claims

A selective glaze pattern less than 13 microns in thickness is obtained by preparing a mixture of a photoresist and a multicomponent oxide glaze frit, applying the resultant mixture to an alumina substrate and exposing, developing and firing the resultant coating.

3,573,909

METHOD OF DEPOSITING PHOSPHOR DOT TRIADS ON A CATHODE RAY TUBE SCREEN

Richard G. O'Fallon, Westchester, Ill., assignor to Motorola, Inc., Franklin Park, Ill.

Filed May 10, 1968, Ser. No. 728,299
Int. Cl. G03c 5/00
U.S. Cl. 96—36.1 6 Claims

The faceplate panel and shadow mask assembly of a color cathode ray tube are mounted on a lighthouse in a spaced relation to a point source of light. A force is applied to the shadow mask screen to tilt the same about the springs connecting it to studs in the faceplate panel. With the mask in the tilted position, the spacing between the shadow mask and the screen when depositing the phosphor dot triad thereon is equal to the spacing between the shadow mask and the screen in an operating installation.

3,573,910

METHOD OF MAKING REPRODUCTION ART WORK LAYOUTS AND PRINTING PLATES FOR COMPOSITE UNIT RECORD CARDS

Henry John Gulliani, Diamond Bar, Calif., assignor to The Bell and Howell Company, Chicago, Ill.

Filed Dec. 1, 1967, Ser. No. 687,339
Int. Cl. G03c 5/04
U.S. Cl. 96—41 20 Claims

A process for making reproduction art work layouts and printing plates for a large plurality of non-conventional composite unit record cards each of which has a unique machine readable portion and a related visually readable portion. A negative photographic material is accurately photographically scribed and a fully punched conventional unit record card is accurately imaged onto a specific portion thereof. The negative is then developed and a positive template is made therefrom so that the machine readable "holes" are black. The positive template is then placed on a light box and covered with a sheet of plastic. A series of conventional machine readable unit record cards are specially punched and sprayed with two coats of black paint to make them opaque. These painted cards are then individually taped in place on the plastic over the positive template so that no light passes through the holes of the individually punched black cards. The positive also serves to locate visually readable sheets corresponding to each of the painted cards. A white sheet is then slipped between the individually punched cards and the plastic. Each of the resulting individual layouts is then used as a reproduction art work layout for a different printing plate in a series of printing plates, which are used to print a series of unique composite cards having printing that is located with a high degree of accuracy.

3,573,911

LIGHT-SENSITIVE COMPOSITION CONTAINING ARYL-THIOKETONES AS COLOR FORMERS

Richard A. Fotland, Lyndhurst, Ohio, assignor to Horizons Incorporated, a Division of Horizons Research Incorporated

No Drawing. Filed Feb. 2, 1967, Ser. No. 613,404
Int. Cl. G03c 3/24
U.S. Cl. 96—48 12 Claims

The photosensitive composition of this invention comprises an organic halogen compound and a color former which is an aryl-thioketone, both of which are dispersed in or supported on a binder or carrier material. The composition exhibits orthochromatic sensitivity in the visible portion of the spectrum and when it is used in the form of a film, the film is capable of being optically developed by exposure to near infrared radiation.

3,573,912

STABILIZATION OF SILVER HALIDE PRINTOUT RECORDING PAPERS

Richard P. Brown, Monrovia, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Continuation of abandoned application Ser. No. 387,029, Aug. 3, 1964. This application May 4, 1967, Ser. No. 641,103
Int. Cl. G03c 5/38, 5/32
U.S. Cl. 96—61 16 Claims

A process in which a printout recording paper having incorporated developing agent is photolytically developed and a stabilizing agent is applied subsequent thereto.

3,573,913

LIGHT-SENSITIVE SILVER HALIDE MATERIALS

Jozef Frans Willems, Wilrijk-Antwerp, and Joseph Louis De Munck, Heide-Kalmthout, Belgium, assignors to Gevaert-Agfa N.V., Mortsel, Belgium

No Drawing. Filed Aug. 22, 1966, Ser. No. 573,832
Claims priority, application Great Britain, Oct. 7, 1965, 42,590/65
Int. Cl. G03c 5/30, 1/28, 1/06
U.S. Cl. 96—66.3 15 Claims

Photographic light-sensitive materials are described which include a urethan which is the reaction product of (1) an alkoxy polyethylene glycol ester of isocyanatoacetic acid having the formula

$$RO-(CH_2-CH_2-O)_n-CH_2-CH_2-O-\overset{\overset{O}{\|}}{C}-CH_2-NCO$$

wherein

R represents an alkyl radical having from 1 to 5 carbon atoms, and

n represents an integer of from 1 to 35, and

an unsubstituted, saturated, aliphatic alcohol; or (2) an isocyanate and a mono-alkyl ether of polyoxyethylene glycol. These materials upon development with a hydroquinone-formaldehyde-bisulphite developer are substantially free of "peppers."

3,573,914

PHOTOGRAPHIC DEVELOPER COMPOSITION CONTAINING CARBONYL BISULFITE AMINE CONDENSATION PRODUCT AND FREE AMINE

Thomas J. Masseth, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Continuation-in-part of abandoned application Ser. No. 583,935, Oct. 3, 1966. This application Aug. 18, 1967, Ser. No. 661,532

Int. Cl. G03c *5/30*

U.S. Cl. 96—66.4 19 Claims

Photographic developer composition for high-contrast elements comprising a developing agent, a carbonyl bisulfiteamine condensation product and free amine. A continuous process for using the developer composition in a continuous transport processing machine is also described.

3,573,915

PHOTOGRAPHIC SILVER HALIDE EMULSIONS CONTAINING NITRO-SUBSTITUTED OR UNSUBSTITUTED CINNAMIC ACID OR CINNAMALDEHYDE

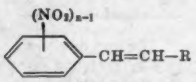
Giacomo Luciani and Fritz Dersch, Binghamton, N.Y., assignors to GAF Corporation, New York, N.Y.

No Drawing. Filed Nov. 16, 1966, Ser. No. 594,675

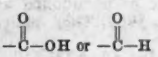
Int. Cl. G03c *1/34, 1/06, 1/76*

U.S. Cl. 96—67 10 Claims

A light-sensitive silver halide material having thereon a light-sensitive silver halide emulsion layer and containing, in the light-sensitive silver halide layer or in a layer in contact therewith, as an antifoggant and stabilizer a compound having the formula:



where R is either



and *n* is 1 or 2.

3,573,916

METHOD FOR PREPARING COLOR ELEMENTS PROVIDING MOTTLE-FREE DYE IMAGES

Richard G. Yost, Spencerport, and Irving S. Willison, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed Apr. 8, 1968, Ser. No. 719,689

Int. Cl. G03c *1/76*

U.S. Cl. 96—74 15 Claims

Mottling of dye images in color coupler-bearing silver halide emulsions which have been coated on electron bombarded hydrophobic surfaces within about 30 minutes after bombardment is substantially eliminated by using sulfo-substituted cyanine or merocyanine spectral sensitizing dyes.

3,573,917

LIGHT-SENSITIVE PRINTING PLATE COMPOSITION

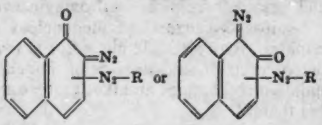
Takashi Okamoto, 6–4 Chuoo 2-chome, Warabi, Saitama Prefecture, Japan

No Drawing. Filed July 12, 1968, Ser. No. 744,298

Int. Cl. G03c *1/60, 1/54*

U.S. Cl. 96—75 2 Claims

Photo process sensitive layer comprising a resin obtained by heating a resin of the cresol novolak type and an organic phosphate containing at least one benzene nucleus under acidic conditions and a sensitive agent represented by the following general chemical structure



wherein R is an aromatic group having no radical that is capable of producing a water-soluble alkaline salt.

3,573,918

UNDERLAYERS OF PLASTICIZER-POLYMER MIXTURES FOR PHOTOPOLYMER THERMAL TRANSFER ELEMENTS

Vaughan Crandall Chambers, Jr., Wilmington, Del., and David W. Woodward, Little Silver, N.J., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Continuation-in-part of application Ser. No. 375,628, June 16, 1964. This application Sept. 26, 1967, Ser. No. 670,755

Int. Cl. G03c *11/12, 1/68*

U.S. Cl. 96—87 12 Claims

A photopolymerizable thermal transfer element comprising (1) a support, (2) a thermoplastic stratum comprising a compatible mixture of about 90 to 50 parts of thermoplastic polymer and about 10 to 50 parts of plasticizer, said mixture being solid below 40° C. and (3) over said thermoplastic stratum a photopolymerizable stratum which is solid below 40° C. and has a stick temperature above about 40° C. and below 150° C. in its unexposed state and a stick temperature in its exposed state of at least 10° C. greater than that of its unexposed state.

3,573,919

PREPARATION OF LIGHT-DEVELOPABLE, DIRECT-WRITING SILVER HALIDE EMULSIONS BY RAPID PRECIPITATION AND LONG RIPENING

John Howard Bigelow, Rochester, N.Y., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Jan. 14, 1969, Ser. No. 791,165

Int. Cl. G03c *1/02*

U.S. Cl. 96—94 10 Claims

Light-developable, direct-writing radiation-sensitive silver halide emulsions having reduced photolyzed image access time and improved sensitometric properties are prepared by precipitating silver chloride in not more than 3 minutes in the presence of 10 to 20 mole percent based on silver of a water-soluble plumbous salt in an acidified aqueous colloid solution, converting the silver chloride to silver bromide by adding a stoichiometric excess of a water-soluble bromide salt and slowly ripening the emulsion by heating at about 150–180° F. for at least 3 hours while adding 10 to 20 mole percent of a separate fine grain silver bromide. The emulsion is washed and redispersed, and a halogen acceptor added along with other final adjuvants prior to coating.

3,573,920

FINE GRAIN SILVER HALIDE EMULSIONS CONTAINING NOVEL DYE COMBINATIONS

Gary L. Hiller, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Continuation-in-part of abandoned application Ser. No. 686,831, Nov. 30, 1967. This application Sept. 5, 1968, Ser. No. 757,789

Int. Cl. G03c *1/22, 1/28*

U.S. Cl. 96—104 41 Claims

Fine grain photographic silver halide emulsions are spectrally sensitized with the combination of (1) a carbocyanine dye having a maximum sensitivity peak at a wavelength shorter than 6563 A., and (2) a carbocyanine

dye having a maximum sensitivity peak at a wavelength longer than 6563 A.; each of the dyes comprising heterocyclic nuclei selected from a 3-sulfoalkylbenzothiazole nucleus, a 3-sulfoalkylbenzoselenazole nucleus and a 1-sulfoalkylnaphtho[1,2-d]thiazole nucleus, the two heterocyclic nuclei of each of said dyes being joined by a trimethine chain which contains an alkyl group on the meso carbon atom thereof.

3,573,921

SILVER HALIDE EMULSIONS CONTAINING POLYNUCLEAR UNDISSOCIATED CYANINE DYES

Philip W. Jenkins and Leslie G. S. Brooker, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

No Drawing. Filed July 28, 1967, Ser. No. 656,648

Int. Cl. G03c *1/10*

U.S. Cl. 96—105 **10 Claims**

Novel polynuclear cyanine dyes are prepared from certain 3,5-pyrazolidinedione compounds. The cyanine dyes obtained extend the sensitivity of photographic silver halide emulsions into the red and infrared regions of the spectrum. 5-<{2,5-bis[3,3-dimethyl-1-(4-sulfobutyl)-2 - indolinylidene]ethylidene}cyclopentylidene>-1,2 - diphenyl-3,5-pyrazolidinedione ditriethylammonium salt is an example of the new dye compounds.

3,573,922

PHOTOPOLYMERIZABLE COMPOSITION AND PROCESS

John B. Rust, Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Continuation-in-part of application Ser. No. 450,397, Apr. 23, 1965. This application May 15, 1969, Ser. No. 824,902

Int. Cl. G03c *1/68*

U.S. Cl. 96—115 **17 Claims**

A method of photopolymerization of a photopolymerizable vinyl monomer system with a photooxidant and catalyst combination capable of coreactivity to effect visible photopolymerization in visible light and more particularly light-activatable dye and sulfinic acid catalyst combination reacting with each other to initiate photopolymerization in and over the light range of about 3800 A. to 7200 A.

3,573,923

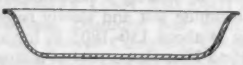
DIELECTRIC HEATING OF FOOD

Kenneth D. Meiser, Dallas, Tex., assignor to Plastics Mfg. Co., Dallas, Tex.

Filed June 18, 1968, Ser. No. 737,924

Int. Cl. B65d *81/34*

U.S. Cl. 99—1 **6 Claims**



A method of preparing food in which the food is placed in a receptacle consisting essentially of a cellulose-filled thermoset aminoplast and having a wall thickness from .015 to .05 inch, and is then exposed to dielectric heating which would char the receptacle if empty.

3,573,924

METHOD OF PELLETING ANIMAL FEED INGREDIENTS CONTAINING HYDROPHILIC MATERIALS

Albert I. Zarow, Mount Pulaski, Ill., assignor to Kanemolass Laboratories, Inc., Mount Pulaski, Ill.

No Drawing. Filed May 31, 1967, Ser. No. 642,354

Int. Cl. A23k *1/02*

U.S. Cl. 99—6 **7 Claims**

A method for pelleting particulate animal feed compositions containing molasses and other hygroscopic ingredients which comprises using dehydrated molasses as the source of carbohydrate in the composition and preheating the composition to a predetermined temperature prior to the introduction of live steam for lubrication to control precisely the moisture content of the pelleted material and increase the efficiency of the pelleting process.

3,573,925

PROCESS

Roger L. Harned, Terre Haute, Ind., assignor to Commercial Solvents Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 647,636, June 21, 1967. This application Apr. 16, 1968, Ser. No. 721,596

Int. Cl. A23k *1/17*; C07d *85/12*

U.S. Cl. 99—9 **17 Claims**

Stabilization of cycloserine in a fermented beer containing cycloserine and O-carbamyl-D-serine by complexing same with a zinc salt.

3,573,926

PROCESS FOR PREPARING ENRICHED RICE

Ichiro Chibata, Toyonaka-shi, and Hiroshi Ito, Nishinomiya-shi, Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

No Drawing. Filed Feb. 9, 1968, Ser. No. 704,273

Claims priority, application Japan, Feb. 16, 1967, 42/9,966

Int. Cl. A23l *1/30, 1/10*

U.S. Cl. 99—11 **4 Claims**

A method of enriching polished rice wherein the rice is soaked in an aqueous solution of a water-soluble thiamine salt followed by treatment with alkaline material. The treatment may also be followed by glutenization of the surface of the rice as by steaming.

3,573,927

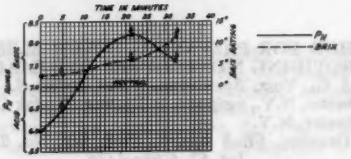
METHOD AND PRODUCTS OF PROCESSING RAW MAPLE SAP

Raymond S. Nessly, 144 N. Marshall St., York, Pa. 17402

Continuation-in-part of abandoned application Ser. No. 500,788, Oct. 22, 1965. This application June 4, 1969, Ser. No. 834,204

Int. Cl. A23l *1/00*

U.S. Cl. 99—28 **6 Claims**



Raw acidic maple sap is heated to produce a product having a pH of between 7.5 and 8.0. Characteristics of the product can be varied by blending with quantities of other prepared maple sap products.

3,573,928

PROCESS FOR PRODUCING BEER

Nicholas G. Marotta, Green Brook, Harvey Bell, North Plainfield, and Gary Bud Charlick, Somerville, N.J., assignors to National Starch and Chemical Corporation, New York, N.Y.

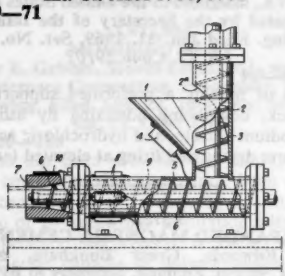
No Drawing. Filed Jan. 21, 1969, Ser. No. 792,806

Int. Cl. C12h *1/14*

U.S. Cl. 99—48 **20 Claims**

A process for preparing a beer which, after being poured, forms a voluminous, creamy-textured and long-lasting foam. The process comprises the addition to the beer, in specified amounts, of a dextrinized starch acid-ester of a substituted dicarboxylic acid.

3,573,929
VEGETABLE EXTRACT PRODUCTION
James Leroy Anderson, Marysville, Ohio, Joachim Artur Gaedtke, Wiesbaden, Germany, and Abraham Rudolph Mishkin, Marysville, Ohio, assignors to Societe d'Assistance Technique Pour Produits Nestles S.A., Lausanne, Switzerland
Filed Mar. 26, 1968, Ser. No. 716,060
Claims priority, application Switzerland, Apr. 14, 1967, 5,328/67; Feb. 27, 1968, 2,837/68
Int. Cl. A23f *1/08, 3/02*
U.S. Cl. 99—71 13 Claims



In a freeze-drying process for tea or coffee extract the fines produced by grinding the frozen extract are compressed to a solid while remaining frozen and the solid is reground. The fines may be compressed in a continuous extruder or a tablet press.

3,573,930
PREPARATION OF DRIED CHEESE
Robert F. Dale, Brookfield, Wis., assignor to Universal Foods Corporation, Milwaukee, Wis.
No Drawing. Filed Mar. 8, 1968, Ser. No. 711,516
Int. Cl. A23c *19/00*
U.S. Cl. 99—115 11 Claims

A process for preparing dried cheese which comprises admixing a cheese with an emulsifier, extruding the cheese with a ram type extruder into elongated noodle form having a diameter of up to about 3/32 inch, drying the extruded noodle at elevated temperatures of up to about 115° F. to a moisture content of up to about 17%. Cheeses which contain up to about 53% fat are adapted for processing to produce a dry storage stable product with essentially no fat separation and do not require refrigeration during storage.

3,573,931
PREPARING DRIED CHEESE
Robert F. Dale, Brookfield, Wis., assignor to Universal Foods Corporation, Milwaukee, Wis.
No Drawing. Filed Mar. 8, 1968, Ser. No. 711,517
Int. Cl. A23c *19/00*
U.S. Cl. 99—115 15 Claims

A process for preparing dried cheese which comprises extruding a high moisture content cheese, with a ram type extruder, into elongated noodle form having a diameter of up to 3/32 inch, drying the extruded noodle at elevated temperatures of up to about 115° F. to a moisture content up to about 17%. Cheeses which contain up to about 53% fat are adapted for processing by the method of this invention to produce a storage stable product which does not require refrigeration.

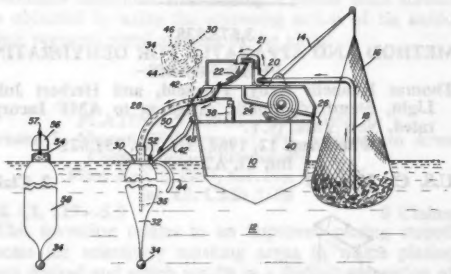
3,573,932
HYDRATED FREEZE-DRIED CONFECTIONS
Maurie Laskin, Milwaukee, Wis., assignor to W. R. Grace & Co., New York, N.Y.
No Drawing. Filed Mar. 3, 1967, Ser. No. 620,278
The portion of the term of the patent subsequent to Aug. 6, 1985, has been disclaimed
Int. Cl. A23g *3/00*
U.S. Cl. 99—134 10 Claims

Freeze-dried, substantially dry confectionary food products to which a chewy consistency has been imparted by partially rehydrating the same to a moisture content of from about 2 to about 10 percent, by weight; and a method for making such products by freeze drying to a substantially dry condition and then controllably rehydrating the same.

3,573,933
CHEWING GUM BASE
David M. MacLeod, Sarnia, Ontario, Canada, assignor to Esso Research and Engineering Company
No Drawing. Filed Nov. 14, 1968, Ser. No. 775,925
Int. Cl. A23g *3/00*
U.S. Cl. 99—135 5 Claims

A chewing gum base is compounded and composed of a low melting point paraffin wax and a higher melting point microcrystalline wax together with small but effective amounts of poly alpha-olefins, for example, polyisobutylene, and of elastomeric olefinic copolymers, such as butyl rubber or ethylene/propylene rubber.

3,573,934
METHOD FOR TRANSPORTING AND STORING AQUATIC FAUNA AND PRESERVING THE SAME
Fern Wood Mitchell, Washington, D.C., assignor to W. R. Grace & Co., New York, N.Y.
Filed July 19, 1968, Ser. No. 746,180
Int. Cl. A23b *3/12*
U.S. Cl. 99—158 2 Claims



The disclosed invention is directed to a method and apparatus for transporting and storing aquatic fauna which includes means for removing aquatic fauna from the aquatic environment, separating the fauna from any residual materials, transferring the fauna to a large flexible elongated storage vessel vertically disposed in the aquatic environment, and when the storage vessel is filled, towing same to a processing station. The present invention also provides a method for preserving the aquatic fauna while in storage.

3,573,935
PROCESS OF PASTEURIZATION OF WHOLE EGGS
John C. Sourby, Mount Kisco, and Willibald F. Kohl, Nanuet, N.Y., and Rudolph H. Ellinger, Chagrin Falls, Ohio, assignors to Stauffer Chemical Company, New York, N.Y.
No Drawing. Continuation-in-part of application Ser. No. 694,831, Jan. 2, 1968. This application May 4, 1970, Ser. No. 34,911
Int. Cl. A23b *5/00*
U.S. Cl. 99—161 4 Claims

A process of pasteurizing liquid whole eggs which consists of separating the eggs from the shells and forming a homogeneous mixture. Sufficient food grade alkali agent is then incorporated therein to raise the pH thereof about 0.5 unit above the natural pH of the eggs and not to exceed a pH of about 8.3. The mixture is then heated to a pasteurization temperature of from 125 to 145° F. for from 0.5 to 10 minutes.

3,573,936

PLICATIC ACID AND THIODIPROPIONIC ACID AS ANTIOXIDANTS FOR USE IN ANIMAL FATS AND VEGETABLE OILS

Arthur Karchmar, Clifton, N.J., and Kevin L. McDonald, Vancouver, British Columbia, Canada, assignors to Rayonier Incorporated, New York, N.Y.

No Drawing. Filed Dec. 15, 1967, Ser. No. 690,755
Int. Cl. A23b *1/12*
U.S. Cl. 99—163 7 Claims

A mixture of plicatic acid and thiodipropionic acid exhibits a synergistic antioxidant effect when added to animal fats and vegetable oils and foodstuffs containing these materials. The plicatic acid-thiodipropionic acid additive, which comprises substantially equal amounts of each component, greatly increases the storage life of fats and oils when added thereto in amounts approximating 100 parts per million.

3,573,937

PROCESS FOR PRODUCING BANANA AND PLANTAIN PRODUCT FRIED CHIPS

Edward J. Sarna, Yonkers, N.Y., assignor to Robert C. Berg, Jr., Bronx, N.Y., and Barstow Bates, Old Greenwich, Conn., fractional part interest to each

No Drawing. Filed Jan. 26, 1968, Ser. No. 700,709
Int. Cl. A23b *7/00, 3/00;* A23l *1/100*
U.S. Cl. 99—204 7 Claims

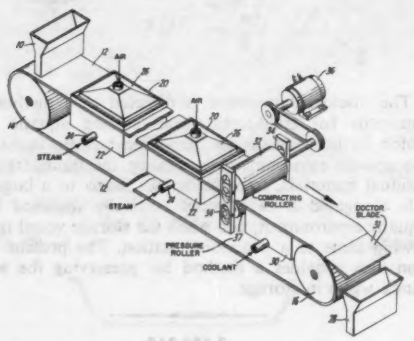
Fried chip products are prepared from thin heat-treated sections of mature, unripened banana and plantain pulp which have been dehydrated.

3,573,938

METHOD AND APPARATUS FOR DEHYDRATING FOOD FOAMS

Thomas Kenneth Kelly, Fairfield, and Herbert Julius Light, Stamford, Conn., assignors to AMF Incorporated, New York, N.Y.

Filed Aug. 12, 1968, Ser. No. 751,821
Int. Cl. A23b *7/02*
U.S. Cl. 99—206 2 Claims



Apparatus and method for drying of foam food products on a continuous belt including means for casting the product on the belt, drying means and means for compacting the product while on the belt.

3,573,939

Ta_2O_5 NUCLEATED GLASS-CERAMIC ARTICLES

George H. Beall, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

No Drawing. Filed Jan. 19, 1968, Ser. No. 699,020
Int. Cl. C03c *3/22*
U.S. Cl. 106—39 4 Claims

This invention relates to the manufacture of glass-ceramic articles in the Li_2O—SiO_2 composition field which are nucleated with Ta_2O_5. Such articles can be transparent to opaque and contain the ferroelectric perovskite crystal $LiTaO_3$ as the principal crystal phase or, when containing Al_2O_3, can be transparent to opaque and contain the low expansion beta-spodumene solid solution and beta-Ta_2O_5 as the primary crystal phase.

3,573,940

FLY ASH BASED PREFORMED SUPPORT STRUCTURES

Charles F. Cockrell and Harry E. Shafer, Jr., Morgantown, W. Va., assignors to the United States of America as represented by the Secretary of the Interior

No Drawing. Filed Jan. 31, 1969, Ser. No. 795,729
Int. Cl. C04b *29/02*
U.S. Cl. 106—84 7 Claims

A process of making a preformed support structure, such as brick, comprising admixing fly ash, a coarse aggregate, sodium silicate, and hydrochloric acid; shaping under pressure; drying and firing at elevated temperatures.

3,573,941

EXPANDED MAGNESIA CEMENT

John Lee Edwards, Great Bookham, and James Macoustra, Sutton, England, assignors to BP Chemicals (U.K.) Limited, London, England

No Drawing. Filed Feb. 26, 1968, Ser. No. 707,941
Claims priority, application Great Britain, Mar. 30, 1967, 14,449/67
Int. Cl. C04b *9/14, 21/02*
U.S. Cl. 106—88 8 Claims

An expanded magnesia cement containing a volume of gas at least equal to the volume of the cement in its unexpanded state. The cement is formed by mixing magnesium oxide, magnesium chloride and water in the presence of a foam-forming surface active agent and in the presence of a foam stabilizing water-soluble silicone, entraining a gas into the resulting mix to form a flowable foam and allowing the foam to set. Particularly useful cement from an economic and structural point of view have three to twelve times the volume of gas present. A method for the production of these expanded cements is also claimed.

3,573,942

CURING AGENT FOR DAMP CONCRETE

Willy K. Wassenberg, Aachen, and Axel K. Commichau, Hamburg-Rissen, Germany, assignors to Mobil Oil Corporation, New York, N.Y.

No Drawing. Filed Dec. 8, 1967, Ser. No. 688,997
Claims priority, application Germany, Dec. 8, 1966, M 71,968
Int. Cl. C08h *11/00;* C08f *19/14*
U.S. Cl. 106—227 12 Claims

A curing agent for damp concrete is provided comprising a cationically adjusted dispersion of a resin, a drying oil, a solvent for said resin, an amine-containing emulsifier and water.

3,573,943

BLEACHING PROCESS

Joseph Barron Rowse, Kenneth John Burr, and Terence Wilfred Webb, St. Austell, Cornwall, England, assignors to English Clays Lovering Pochin & Company Limited, St. Austell, Cornwall, England

Filed Aug. 5, 1968, Ser. No. 750,181
Claims priority, application Great Britain, Aug. 11, 1967, 37,123/67
Int. Cl. C09c *1/02, 1/42*
U.S. Cl. 106—288 7 Claims

In a process for bleaching a mineral wherein there is formed a flowing stream of an aqueous suspension of the mineral and wherein a dithionite bleaching compound is dispersed in said stream to bleach said mineral, the improvement which comprises dispersing said dithionite bleaching compound in said stream at a known rate, passing a quantity of said stream at a steady rate of flow and after the dithionite has been dispersed in said stream

for a time ranging from ¼ minute to 30 minutes through a housing containing an electrode assembly for a polarograph, measuring the polarographic diffusion current corresponding to the concentration of unreacted dithionite bleaching compound remaining in said stream, and if necessary adjusting the rate at which the dithionite bleaching compound is dispersed in said stream to ensure that the concentration of the dithionite bleaching compound in said stream is at a desired level.

3,573,944
MODIFIED CLAY
Stanley E. Gebura, Mount Lakes, N.J., assignor to Interpace Corporation, Parsippany, N.J.
No Drawing. Filed Apr. 22, 1968, Ser. No. 723,301
Int. Cl. C09c *3/02*
U.S. Cl. 106—288 **15 Claims**

A process has been provided for modifying siliceous substances containing aluminum oxide from which bound water has been driven off, such as by heating at elevated temperature or by azeotropic distillation with certain solvents. The product thus prepared is reacted with an alkylene divinyl ether capable of polymerization at a site of the siliceous substance from which water has been removed. As a surprising advantage, a divinyl ether does polymerize substantially only on the surface of the siliceous materials rather than propagate into the solvent and form homopolymers. Products prepared by this process are within the scope of the invention as are the uses of these products for purposes as adjuvants in poly(ester) and oleaginous composition formulations.

3,573,945
PROCESS FOR IMPROVING PIGMENTARY METAL OXIDES
Harry Lott, Jr., Akron, and Albert Dietz, Wadsworth, Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.
No Drawing. Filed July 6, 1965, Ser. No. 469,881
Int. Cl. C09c *1/36, 3/00*
U.S. Cl. 106—300 **18 Claims**

Pigmentary metal oxides, particularly titanium dioxide, are prepared by vapor phase oxidation of corresponding metal halides. A method for wet treating raw metal oxide to improve pigmentary properties is described.

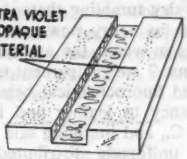
3,573,946
PIGMENT COMPOSITIONS
Karlheinz Wolf, Cologne-Stammheim, Volker Aign, Langenfeld, Reinhold Hornle, Cologne-Flittard, and Artur Haus, Leverkusen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany
No Drawing. Filed Sept. 29, 1967, Ser. No. 671,555
Claims priority, application Germany, Oct. 1, 1966, F 50,343; Feb. 1, 1967, F 51,412
Int. Cl. C09c *3/02*
U.S. Cl. 106—308 **19 Claims**

Organic or inorganic pigments are treated by contact in the dry or dispersed form, with cycloaliphatic amine, preferably at elevated temperatures. Optionally, the treated pigments are then acidified. Treated pigments exhibit good dispersibility and high tinctorial strength.

3,573,947
ACCELERATOR FOR GYPSUM PLASTER
William Kinkade, Lisle, Ill., and Eugene Edward O'Neill, Okeene, Okla., assignors to United States Gypsum Company, Chicago, Ill.
No Drawing. Filed Aug. 19, 1968, Ser. No. 753,786
Int. Cl. C04b *13/22, 13/24*
U.S. Cl. 106—315 **15 Claims**

A process for producing an accelerator for a calcium sulfate plaster comprising the steps of grinding together calcium sulfate dihydrate and sucrose at a temperature of up to about 145° F. until the surface area of the mixture is substantially increased, and heating the ground mixture under conditions which essentially preclude the formation of a dewpoint condition in the mixture to a final moisture content from about 6% to about 14% by weight.

3,573,948
METHODS OF MAKING AN IMAGE PLANE PLATE
Milton S. Tarnopol, Brackenridge, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.
Continuation-in-part of application Ser. No. 701,425, Jan. 29, 1968. This application Mar. 12, 1968, Ser. No. 712,533
Int. Cl. G03c *5/00;* **H05k** *3/00*
U.S. Cl. 117—5.5 **3 Claims**



The invention comprises improvements in making image-plane plates of glass stained on one surface thereof, in accordance with which improved resolution and/or the advantages associated with having a planar plate surface are obtained by using the screening action of tin oxide, which prevents metal staining of the glass.

3,573,949
PLATING STOPOFF PROCESS
Bernard L. Sharon, Williamsport, Pa., assignor to Avco Corporation, Williamsport, Pa.
Filed Apr. 1, 1969, Ser. No. 811,936
Int. Cl. C23b *5/00*
U.S. Cl. 117—5.5 **8 Claims**

This invention relates to an improved plating stopoff process for selectively masking areas in which plating is not desired and which results in a distinct separation of plated and non-plated surface areas.

3,573,950
PROTECTIVE COATING OF GLASS SURFACE
Joseph J. Domicone, Horseheads, N.Y., assignor to Corning Glass Works, Corning, N.Y.
No Drawing. Filed Sept. 27, 1968, Ser. No. 763,367
Int. Cl. C03c *17/28, 15/02*
U.S. Cl. 117—6 **6 Claims**

A method of preserving the wettability of a glass surface by treating the glass with an aqueous solution of gluconic acid.

3,573,951
PREPARATION OF SYNTHETIC FILM MATERIALS
Terence Arnold Abbott, Basil R. Shephard, David Rankine Kennedy, and Margaret Loudon Clachan, Brantham, Manningtree, Essex, England, assignors to Bexford Limited, Brantham, Manningtree, Essex, England
No Drawing. Continuation-in-part of application Ser. No. 511,980, Dec. 6, 1965, now Patent No. 3,506,445. This application Sept. 22, 1966, Ser. No. 581,182
Claims priority, application Great Britain, Dec. 9, 1964, 50,118/64
The portion of the term of the patent subsequent to Apr. 14, 1987, has been disclaimed
Int. Cl. G03c *1/80;* **B29d** *7/24*
U.S. Cl. 117—7 **2 Claims**

A process for producing film base material consisting of biaxially orientated and heatset polyethylene terephthalate

having a superimposed layer consisting of homopolymers of vinyl halogenoacetate and vinyl cyanocaetate or copolymers thereof with unsaturated carboxylic acids, vinyl acetate or vinyl alcohol wherein the superimposed layer may be applied before or after orientation.

3,573,952

PROCESS FOR IMPARTING OIL REPELLENCY TO SUEDE LEATHER

Thomas W. Berger, Roseville, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

No Drawing. Filed Oct. 21, 1968, Ser. No. 769,358
Int. Cl. B44d *1/094, 1/32*
U.S. Cl. 117—16 **6 Claims**

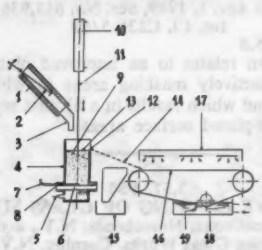
A process for imparting oil repellency to the surface of suede leather which comprises adding to said suede leather during the dry tumbling thereof a fluorochemical in particulate form as a dry power or as suspended or emulsified particles in water, the amount of added water not exceeding about 7 weight percent of the total suede leather weight, said fluorochemical being capable of imparting oil repellency to leather and having a melting point below 200° C., and tumbling said leather until said fluorochemical is uniformly distributed over the suede surface.

3,573,953

PROCESS AND APPARATUS FOR COATING SMALL OBJECTS

Jean Michel Laulan, Lyon, France, assignor to Rhone-Poulenc S.A.

Filed Sept. 8, 1966, Ser. No. 577,960
Claims priority, application France, Sept. 15, 1965, 31,541
Int. Cl. B44d *1/095*
U.S. Cl. 117—21 **10 Claims**



Heated articles are passed into a bed of fluidized plastic material having a dense zone and a less dense zone. The articles contact an upper more dense zone first and a lower less dense zone thereafter, wherein they are coated with the plastic material.

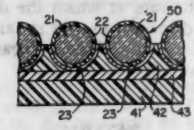
3,573,954

REFLEX-REFLECTORS AND METHOD FOR THE MANUFACTURE THEREOF

Tadashi Yamamoto, Kyoto, Japan, assignor of fractional part interest to Nihon Koken Co., Ltd., Ogawa Chiyokawa-cho, Kameoka, Kyoto, Japan

Filed July 1, 1968, Ser. No. 741,399
Claims priority, application Japan, July 5, 1967, 42/43,193; Oct. 18, 1967, 42/67,134
Int. Cl. B44c *1/08*
U.S. Cl. 117—27 **4 Claims**

A method for the manufacture of microspherical lens elements for use in reflex-reflecting devices. Glass microspheres are tumbled in a rotating drum, sprayed with synthetic resin solution and cured to form the lens elements. The lens elements are next coated with reflective plating. The reflex-reflecting device is completed by preparing a substrate with a bonding layer, depositing the lens elements on the substrate, removing the reflective metal plating from the portion of the lens elements projecting from the substrate and finally coating the entire surface of the substrate and lens element assembly with a transparent synthetic resin to form a flat surface.



3,573,955

METHOD OF MAKING A CATHODE-RAY TUBE

Johannes de Gier and Reinhart Charles Willem Elsses, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 15, 1966, Ser. No. 542,967
Claims priority, application Netherlands, Apr. 17, 1965, 6504936
Int. Cl. H01j *31/20*
U.S. Cl. 117—33.5 **5 Claims**

Discoloration of glass in window portion of cathode-ray tube due to high energy electron bombardment is prevented by providing a thin transparent layer free of easily reducible metal ions between the glass and the superposed luminescent screen.

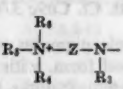
3,573,956

OPTICAL BRIGHTENING OF POLYACRYLONITRILE FIBERS

Heinrich Hausermann, Riehen, and Eduard Troxler, Basel, Switzerland, assignors to Geigy Chemical Corporation, Ardsley, N.Y.

No Drawing. Original application July 23, 1968, Ser. No. 746,746, now Patent No. 3,518,266, dated June 30, 1970. Divided and this application Aug. 25, 1969, Ser. No. 870,847
Int. Cl. C09k *1/02;* **D06l** *3/12*
U.S. Cl. 117—33.5 **7 Claims**

Methods of optically brightening polyacrylonitrile fibers by applying from about 0.001 to about 0.5% calculated on the weight of the fibers quaternary 3-aryl-7-[triazinyl-(2)-amino]-coumarin salts in which the carbon atom in 4-position in the triazinyl nucleus is substituted by a lower alkyl group, an optionally substituted lower alkoxy or lower alkylthio group, or an unsubstituted or organically substituted amino group, and the carbon atom in 6-position in the triazinyl nucleus is substituted by the grouping



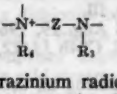
wherein

Z represents an alkylene or oxa-alkylene bridge;

R_3 represents hydrogen or a lower alkyl or alkenyl group;

R_4, R_5 and R_6 represent certain organic substituents or

R_4 and R_5 together with the nitrogen atom represent certain heterocyclic radicals, or the grouping

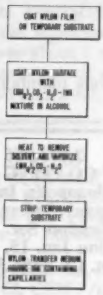


may represent a piperazinium radical, and which novel coumari are useful for protecting foodstuffs.

3,573,957
PROCESS FOR PREPARING POROUS INK CONTAINING TRANSFER MEDIUM

Hugh T. Findlay and Roszell Mack, Jr., Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 5, 1968, Ser. No. 750,317
Int. Cl. B41m 5/10
U.S. Cl. 117—36.1 2 Claims


COAT NYLON FILM ON TEMPORARY SUBSTRATE
COAT NYLON SURFACE WITH MIXTURE IN ALCOHOL
HEAT TO REMOVE SOLVENT AND VAPORIZE
STRIP TEMPORARY SUBSTRATE
NYLON TRANSFER MEDIUM HAVING INK CONTAINING CAPILLARIES

A porous, ink containing transfer medium is prepared by coating the surface of a polymer film, such as a polyamide, with a pore forming agent, such as ammonium bicarbonate, contained in a solvent such as ethanol, which is at least a partial solvent for the polymer film, to impregnate a portion of the pore forming agent into the surface of the polymer film. The solvent is removed and the film is heated to cause the pore forming agent to vaporize and form an open pored capillary structure in the surface of the film. The marking material can be incorporated either with the pore forming either with the pore forming agent or after the open pored capillary structue has been formed.

3,573,958
HEAT SENSITIVE RECORDING SHEET

Francis E. Small, Nashua, N.H.,
(12600 Morrow NE., Albuquerque, N. Mex. 87112)

No Drawing. Filed May 31, 1968, Ser. No. 733,260
Int. Cl. B41m 5/18, 5/26
U.S. Cl. 117—36.8 7 Claims

A heat marking process using a novel heat sensitive recording sheet. The recording sheet comprises a substrate impregnated or coated with a heat sensitive composition of an indicator material, preferably ninhydrin or a derivative of ninhydrin, and an adduct of an amine ligand and an acceptor molecule of a halide or an organometallic halide of a member selected from the group consisting of germanium, tin, lead, and silicon; said adduct being stable at room temperature and dissociating at elevated temperatures, preferably temperatures in excess of 50° C., and most preferably, within the temperature range of 50° C. to 150° C. A record is formed by selective heating in a desired pattern to dissociate the adduct and liberate the amine for reaction with the indicator material. The recording sheet is more stable than prior art all organic recording sheets both prior to and subsequent to recording and forms deeper colored marks of high intensity.

3,573,959
PROCESS FOR MOISTURE-PROOFING METALS

Marnell A. Segura, Edwin E. Sale, and John C. Winkler, Baton Rouge, La., assignors to Esso Research and Engineering Company

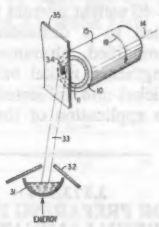
No Drawing. Filed Feb. 5, 1969, Ser. No. 796,918
Int. Cl. B44d 1/06, 1/46
U.S. Cl. 117—37 17 Claims

A process for rendering metal surfaces water repellent, especially particulate metals and porous metal briquettes or similar aggregate structures, including, particularly, chemically active ferrous metals as resultant from direct iron ore reduction processes. Such briquettes or powders, while hot, are immersed, dripped, sprayed, or otherwise contacted with admixtures of certain kinds of olefins, contained in critical concentrations within the admixture. Suitably, the olefin admixture contains polyenes and dienes, preferably cyclopolyenes and cyclodienes. The briquettes or powders are contacted with the olefin admixtures ranging from about 300° F. to about 700° F., or higher, and more particularly at from about 400° F. to about 600° F., at times sufficient to induce penetration of the olefins into the pores and crevices of the metallic surfaces. The contact time and surface temperature of the metal are thus controlled, and the temperature of the olefinic mixture is not permitted to rise to more than about 300° F. The olefins penetrate into the capillaries and crevices of the metal particles, even when the particles have been compacted into dense masses such as briquettes, sufficient when cured to produce discontinuous hydrophobic resinous deposits which render both outer and inner metal surfaces water repellent.

3,573,960
TORSIONAL MODE ELASTIC WAVE TRANSDUCERS

Robert S. Duncan, Winston-Salem, N.C., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Filed Dec. 19, 1968, Ser. No. 785,268
Int. Cl. B05c 1/16, 3/20
U.S. Cl. 117—38 4 Claims



A method of forming torsional mode elastic wave transducers by evaporating or otherwise depositing piezoelectric material on an end surface of a delay line at an angle to this surface while the line is rotating. The material forms a ring with the piezoelectric polarization and direction of shear motion circumferential to said ring.

3,573,961
METHOD FOR MAKING REFRACTORY OXIDE-COATED MATERIALS

Houston Terry Hawkins, Seneca, S.C., and Donald L. Schmidt, Dayton, Ohio, assignors to the United States of America as represented by the Secretary of the Air Force

No Drawing. Original application Dec. 2, 1964, Ser. No. 415,522. Divided and this application June 28, 1968, Ser. No. 760,369
Int. Cl. B44d 5/12
U.S. Cl. 117—47 14 Claims

A method for manufacturing oxide-treated carbonaceous material is provided whereby a carbonaceous fibrous base is immersed in a silica solution, providing a silica coating on the base, which upon drying forms a continuous film. The resulting product is particularly useful in the preparation of composite materials in the form of fiber-reinforced plastic laminates or filament wound fiber-plastic combinations.

3,573,962
METHOD FOR THE DRY LUBRICATION OF MECHANICAL COMPONENTS

Bernard Blampin, Chilly-Mazarin, France, assignor to Electricite de France (Service National), Paris, France

No Drawing. Filed Oct. 24, 1968, Ser. No. 770,421
Claims priority, application France, Nov. 22, 1967, 129,190
Int. Cl. F16c *33/04, 33/16*
U.S. Cl. 117—49 5 Claims

A method for the dry lubrication of mechanical components in the hot state and in a gaseous atmosphere when friction forces are established between said components. The method consists in the successive steps of depositing an adherent coating of calcium fluoride on the friction surface of one of the components considered, in depositing a hardness-increasing coating made up of a similarly adherent substance on the friction surface of the component which is intended to cooperate with the first and in then applying graphite to at least one of said two friction surfaces.

3,573,963
METHOD OF COATING NICKEL BASE ALLOYS WITH A MIXTURE OF TUNGSTEN AND ALUMINUM POWDERS

Douglas H. Maxwell, North Palm Beach, Fla., assignor to United Aircraft Corporation, East Hartford, Conn.

Original application July 5, 1966, Ser. No. 562,648, now Patent No. 3,450,512, dated June 17, 1969. Divided and this application Dec. 20, 1968, Ser. No. 810,876
Int. Cl. C23c *7/00*
U.S. Cl. 117—71 10 Claims

High temperature nickel base alloys are metallized with a mixture of powders consisting of 60–90 weight percent aluminum and 10–40 weight percent tungsten. The coated alloys are subjected to a diffusion heat treatment to form a tungsten-modified, aluminum-rich intermetallic.

Dispersion strengthened nickel base alloys are coated with a layer of nickel and subjected to a diffusion heat treatment prior to application of the aluminum-tungsten mixture.

3,573,964
PROCESS FOR PREPARING FABRIC-VINYL RESIN LAMINATES

Peter William Jones, Loughborough, England, assignor to Fisons Industrial Chemicals Limited, Loughborough, England

Filed June 11, 1968, Ser. No. 736,199
Int. Cl. B29c *13/04;* B32b *5/18*
U.S. Cl. 117—76 14 Claims

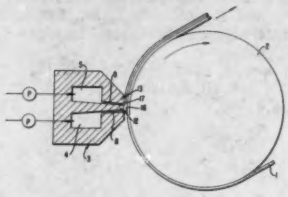
Coating of plastic materials are applied to fabrics by applying at least one coating of plastisol to the surface of an internally heated rotating cylinder wherein the surface possesses the property of release with respect to the plastisol, applying the plastisol to a fabric just prior to the gelling of the plastisol to form a laminate, pressing the laminate against the cylinder, removing the laminate from cylinder and fusing the plastisol.

3,573,965
MULTILAYER COATING METHOD

Mamoru Ishiwata, Yosuke Uchida, and Yoshiaki Nagai, Kanagawa, Japan, assignors to Fuji Shashin Film Kabushiki Kaisha, Minami Ashigara-machi, Ashigara-Kamigun, Kanagawa, Japan

Filed Dec. 5, 1967, Ser. No. 688,059
Claims priority, application Japan, Dec. 7, 1966, 41/80,243
Int. Cl. B44d *1/12;* G03c *1/74*
U.S. Cl. 117—83 1 Claim

This invention relates to a multilayer coating method which is characterized in making the viscosity of a second layer greater than that of a first layer when two or more coating compositions pass through a doctor channel,

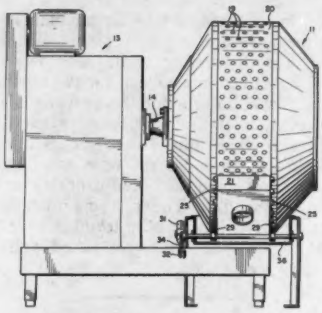


the coating compositions maintaining the relation of superimposed layers.

3,573,966
TABLET COATING METHOD

Van B. Hostetler, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation of application Ser. No. 708,261, Feb. 26, 1968. This application Jan. 15, 1970, Ser. No. 3,213
Int. Cl. B05c *3/04*
U.S. Cl. 117—100 2 Claims

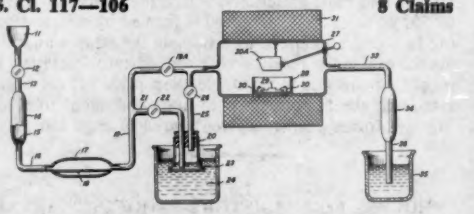


A tablet coating method wherein apparatus is provided having a vented area about the periphery of a rotary tumbling drum. Exhaust means is removably positioned adjacent a portion of the drum's vented section in a manner which draws air and the coating material through the bed of tumbling tablets.

3,573,967
VAPOR-LIQUID-SOLID CRYSTAL GROWTH TECHNIQUE

William G. Pfann, Far Hills, and Richard S. Wagner, Bernardsville, N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Filed Mar. 1, 1967, Ser. No. 619,680
Int. Cl. C23c *11/00, 13/04*
U.S. Cl. 117—106 8 Claims



The controlled growth of a crystalline material upon a seed crystal is effected by means of the vapor-liquid-solid crystal growth mechanism, the seed crystal being physically isolated from the vapor source by immersion thereof in a liquid solution supersaturated with respect to the crystalline material.

3,573,968

PROCESS FOR COATING SOLID SUBSTRATES WITH PARA-XYLYLENE POLYMERS

William E. Loeb, Martinsville, and Harold B. Robinson, Jr., Chatham Township, N.J., assignors to Union Carbide Corporation

No Drawing. Filed Jan. 22, 1968, Ser. No. 699,316
Int. Cl. C23c *13/04*
U.S. Cl. 111—106 8 Claims

Para-xylylene polymer coated substrates exhibiting strong polymer-substrate interfacial bonds are obtained by deposition coating the substrates to a para-xylylene polymer thickness of up to about 5 microns and thereafter maintaining the coated substrate at a temperature of from 100 to 200° C. for at least 0.25 hour.

3,573,969

METHOD FOR SURFACE NITRIDING BORON FILAMENTS

José Camahort, Millbrae, and Mario P. Gomez, Sunnyvale, Calif., assignors to Lockheed Aircraft Corporation, Burbank, Calif.

Filed Aug. 19, 1968, Ser. No. 753,589
Int. Cl. C23f *7/00*
U.S. Cl. 117—106 13 Claims

A method for surface nitriding boron filaments to make the filaments useful as reinforcement agents in composite materials. The method involves initially forming a liquid boron oxide coating on the filament, for example, by heating the filament at temperatures of from about 560° C. to 800° C. in an oxidizing atmosphere and then converting the liquid oxide coating to a solid, continuous boron nitride coating by, for example, heating the filment at temperatures of from about 600° C. to 1100° C. in a nitrogen-containing atmosphere.

3,573,970

METHOD FOR DEPOSITING Os FILMS

Robert C. Langley, Millington, N.J., assignor to Engelhard Minerals & Chemicals Corporation, Newark, N.J.

No Drawing. Filed Apr. 16, 1969, Ser. No. 816,812
Int. Cl. C03c *17/06;* C23c *3/04*
U.S. Cl. 117—119 12 Claims

Osmium tetroxide-olefin complex compounds soluble in organic film-forming media are used for preparing osmium films.

3,573,971

PROCESS OF MAKING PERMANENT-PRESS FABRICS AND GARMENTS

Sidney Cohen, Hillsdale, Thaddeus A. Gulakowski, Ridgefield, and Phillip Adams, Murray Hill, N.J., assignors to Millmaster Onyx Corporation, New York, N.Y.

No Drawing. Continuation of application Ser. No. 688,327, Dec. 6, 1967. This application Nov. 14, 1969, Ser. No. 877,017
Int. Cl. D06m *15/54*
U.S. Cl. 117—139.5 1 Claim

A process for treating fabrics to provide permanent-press pleats, creases, etc., while maintaining soft "hand" and good color fastness, which comprises applying a specific treating composition to the fabric, then pressing in the pleats, creases or the like, sewing the fabric into a garment or the like when so desired, and then curing the composition in situ. The specific composition is formed by reacting an aqueous formaldehyde-urea solution with urea under alkaline conditions, heating the mixture to a predetermined temperature, adding an alcohol at acidic pH, heating again to a predetermined temperature, neutralizing the pH of the mixture, stripping off the volatile matter, and then adding a loweralkylcarbamate to the residue and reacting further at an alkaline pH at a predetermined temperature for a period sufficient to cause the reaction to go to completion. The essential step in this process is the addition of the loweralkylcarbamates as the last step. The term "loweralkylcarbamate" includes not only unsubstituted alkyls but such substituted lower alkyls as methoxy and hydroxyloweralkyl.

3,573,972

GLAZE COMPOSITIONS AND METHOD

William H. McNeely and William P. Fairchild, San Diego, and Austin R. Hunter, La Mesa, Calif., assignors to Kelco Company, San Diego, Calif.

No Drawing. Continuation of application Ser. No. 547,748, May 5, 1966, which is a continuation-in-part of application Ser. No. 416,147, Dec. 4, 1964, which in turn is a continuation-in-part of application Ser. No. 11,988, Mar. 1, 1960. This application Jan. 8, 1970, Ser. No. 3,555
Int. Cl. C03c *17/00*
U.S. Cl. 117—169 10 Claims

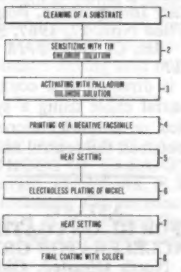
A method of glazing in which an aqueous glaze mixture containing a small effective quantity of a Xanthomonas hydrophilic colloid is applied as a coating to a substrate material which is then fired to form a glazed surface. The quantity of Xanthomonas hydrophilic colloid present in the glaze mixture is effective to increase the cling of the mixture to the substrate material while, at the same time, providing good spreadability of the glaze mixture. After application of the coating of aqueous glaze material to the substrate material, the coated substrate is fired.

3,573,973

HIGH SPEED ADDITIVE CIRCUIT PROCESS

John S. Drotar, Endicott, N.Y., Arden A. Parker, Hightstown, N.J., and Keith A. Snyder, Vestal, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 13, 1967, Ser. No. 682,373
Int. Cl. H05k *1/00*
U.S. Cl. 117—212 5 Claims



A high speed additive circuit process for manufacture of circuit lines upon a polyester or polyimide substrate, including through-holes therein, comprising the steps of cleaning, sensitizing, activating, printing a negative facsimile, of the final desired pattern over the activated surface, heat setting, electroless nickel plating, curing, and final conductive coating by flow soldering. Only one step may exceed one minute in time. Temperatures and time at temperature details are included. Conductive lines as fine as 2 mils wide on 4 mil centers may be made by this process.

3,573,974

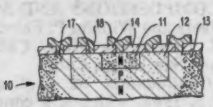
METHOD OF FABRICATING OHMIC CONTACTS AND CONDUCTIVE CONNECTORS

Paul P. Castrucci, Poughkeepsie, and Edward G. Grochowski, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 21, 1968, Ser. No. 714,840
Int. Cl. C23c *11/02;* H01l *7/00*
U.S. Cl. 117—212 9 Claims

A method for forming aluminum ohmic contacts and conductive connectors on semiconductor devices having

silicon dioxide passivating masks covering portions of a semiconductor substrate. The aluminum contacts and connectors are formed by the disproportionation of aluminum mono-halide vapor in the presence of the silicon dioxide



masked substrate. The aluminum formed by the disproportionation is deposited as a layer over the masked substrate. Then, portions of the aluminum layer are selectively removed to leave a pattern of ohmic contacts and conductive connectors.

3,573,975

PHOTOCHEMICAL FABRICATION PROCESS

Vir A. Dhaka and Edwin R. Clark, Poughkeepsie, and Arnold Pinck, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

No Drawing. Filed July 10, 1968, Ser. No. 743,596
Int. Cl. G03c *5/00*
U.S. Cl. 117—212 **18 Claims**

In a photochemical fabrication process wherein a photoresist layer is image-wise exposed by contact exposure through a mask, the improvement of providing a liquid interface between the photoresist layer and mask prior and during exposure.

3,573,976

METHOD OF MAKING COAXIAL CABLE

Jerome J. Duane, Lincoln, Mass., assignor to United-Carr Incorporated, Boston, Mass.

No Drawing. Filed Nov. 17, 1967, Ser. No. 683,804
Int. Cl. B44d *1/18*
U.S. Cl. 117—217 **2 Claims**

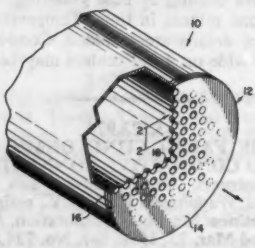
This invention is directed at a coaxial cable, and particularly, at a coaxial cable using a syntactic foam containing glass, silica or ceramic microspheres as the dielectric medium between the central and outer conductors.

3,573,977

PROCESS FOR GLASS COATING AN ION ACCELERATOR GRID

Bruce A. Banks, North Olmsted, Ohio, assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed Sept. 19, 1968, Ser. No. 760,928
Int. Cl. C23d *5/04, 7/00*
U.S. Cl. 117—224 **5 Claims**



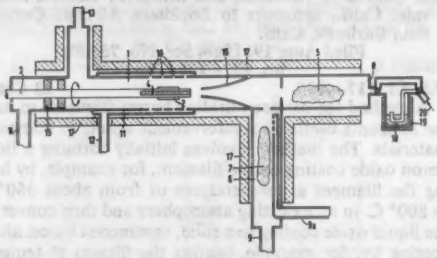
Minimizing bubbles in a fused glass coating on a perforated plate forming the single grid of an ion thrustor accelerator system. A slurry coated grid is first heated in a helium atmosphere which is subsequently changed to argon so that entrapped helium diffuses out of the glass.

3,573,978

METHOD OF PRODUCING LAYERS OF THE INTERMETALLIC SUPERCONDUCTING COMPOUND NIOBIUM TIN (Nb_3Sn) ON A CARRIER

Kyongmin Kim, Fairview, Halifax N.S., Canada, and Günther Ziegler, Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin, Germany

Filed Aug. 2, 1968, Ser. No. 753,016
Claims priority, application Germany, Aug. 4, 1967, P 16 21 345.9
Int. Cl. C23c *11/00*
U.S. Cl. 117—227 **9 Claims**



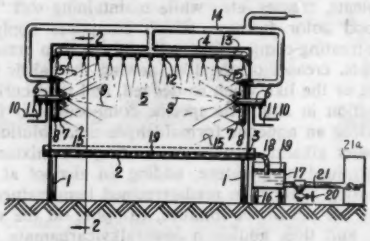
Described is a method of producing layers of the intermetallic superconducting compound niobium tin (Nb_3Sn) upon a carrier. The method is characterized in that chlorine gas is passed across heated niobium to produce gaseous niobium chloride. Separately therefrom bromine gas is passed across heated tin to produce tin bromide. Subsequently the halogens are mixed and reduced by hydrogen upon a heated carrier in a reaction vessel.

3,573,979

METHOD OF MANUFACTURING FLOW-DETECTING GRANULATED COLORING MAGNETIC PARTICLES

Kazuo Honjo, 7–17, 4-chome, Koshienguchi, Nishinomiya, Hyogo, Japan

Filed May 8, 1968, Ser. No. 727,501
Claims priority, application Japan, July 1, 1967, 42/42,496
Int. Cl. H01t *1/26;* B44d *1/08*
U.S. Cl. 117—234 **6 Claims**



The method of manufacturing flaw-detecting granulated colored magnetic particles comprising the steps of adding

iron dust, a coloring agent, and a binder to a solvent. These ingredients are blended to make a mixed liquid material and said mixed liquid material with a separation agent therein is sprayed with the iron dust. Then the mixed liquid material is separated into particles of iron dust coated with the coloring agent so as to produce colored magnetic particles.

3,573,980

METHOD OF MAKING MAGNETIC PARTICLES AND RECORDING TAPE

Willis D. Haller, St. Paul, and Raymond M. Colline, Fridley, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 19, 1968, Ser. No. 706,401
Int. Cl. B44d *1/18*
U.S. Cl. 117—238 **7 Claims**

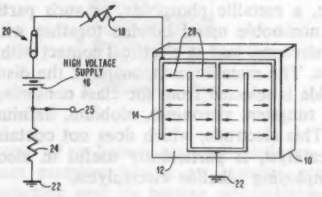
Method of making magnetizable acicular gamma-Fe_2O_3 particles modified with small amounts of cobalt oxide, which particles are useful for making magnetic recording tape of high coercivity affording superior ability to store high frequency information. Even higher coercivity may be attained by controlling the heating steps in making the novel particles to provide up to 20% FeO by weight of the total iron oxide.

3,573,981

METHOD AND APPARATUS FOR INDUCING UNIAXIAL ANISOTROPY IN MAGNETIC FILM THEREBY, AND MEMORY USING THE FILM

Kie Y. Ahn, Bedford, and Joseph M. Viggiano, Yonkers, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 14, 1967, Ser. No. 690,589
Int. Cl. C23c *13/02, 13/04*
U.S. Cl. 117—240 **15 Claims**



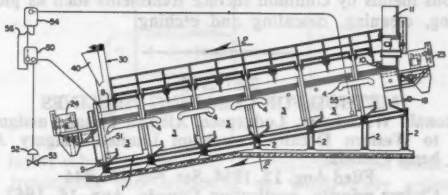
This disclosure provides a magnetic film with induced uniaxial anisotropy, i.e., a film with an easy axis and a hard axis for magnetization. The practice of the disclosure includes deposition of partially ionized components of a magnetic material onto a heated substrate in the presence of an applied electric field adjacent to and contiguous with the surface of the substrate. The easy axis of the induced uniaxial anistropy in the deposited magnetic film is in the direction of the applied electric field in the film. The magnitudes of the temperature of the surface of the substrate and of the electric field control both the magnitude and direction of the uniaxial anisotropy in the film. The degree of ionization of the components of the film during vapor transport to the surface of the substrate establishes another control of the resultant induced uniaxial anisotropy in the film. Exemplary magnetic films for the practice of this disclosure are Ni-Fe of 81/19 ratio of the atomic components Ni and Fe and films of rare earth compounds and alloys, e.g., EuO compound and Eu-Gd alloys.

3,573,982

CONTINUOUS DIFFUSION APPARATUS AND PROCESS

Harold F. Silver, Denver, Colo., assignor to CF & I Engineers, Inc., Denver, Colo.

Continuation of application Ser. No. 490,526, Sept. 27, 1965. This application July 11, 1969, Ser. No. 845,672
Int. Cl. C13d *1/10, 1/12*
U.S. Cl. 127—5 **15 Claims**



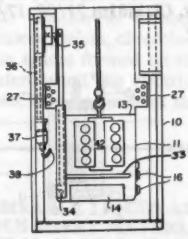
A continuous diffusion process and apparatus, comprising an elongated tank inclined to the horizontal and closed to the atmosphere in liquid-confining relation throughout its circumferential and lengthwise extent thereby establishing a treatment zone of substantial vertical extent in which newly introduced pulp is passed countercurrent to a flow of solution which becomes progressively enriched by contact with the pulp, said apparatus having a plurality of helical flight conveyors with lapping blades arranged to confine and impel the pulp with its solids content submerged throughout a progressive movement from the lower end to the upper end of the liquid-confining area and having means associated with a pulp feed inlet at its lower end for force feeding an entering pulp feed downwardly into and along a submerged course at the lower end of the tank between an end flight of one said conveyor and a next forward conveyor flight so as to maintain the submerged course within a flow of enriched solution passing to a discharge outlet at the lower end of the tank and thereby preventing emergence of pulp solids from associated solution during said movement.

3,573,983

ULTRASONIC IMPACT CLEANERS AND METHODS OF CLEANING

John N. Antonevich, Jamestown, N.Y., assignor to Blackstone Corporation

Continuation-in-part of application Ser. No. 730,261, May 20, 1968. This application June 1, 1970, Ser. No. 42,036
Int. Cl. B08b *7/02*
U.S. Cl. 134—1 **7 Claims**



A method for cleaning by subjecting articles to be cleaned simultaneously to impact and ultrasonically agitated solvent. An apparatus is provided having a wash tank containing solvent, means in the tank ultrasonically agitating the solvent therein and means in the tank periodically impacting the articles to be cleaned while the solvent is ultrasonically agitated.

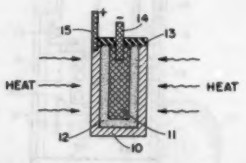
3,573,984
ALKALINE DESMUTTING COMPOSITION FOR FERROUS METALS
Dilip G. Shah, Wolcott, Conn., assignor to MacDermid Incorporated, Waterbury, Conn.
No Drawing. Filed Apr. 17, 1968, Ser. No. 721,946
Int. Cl. C23g 1/20
U.S. Cl. 134—2 5 Claims

An aqueous alkaline ferricyanide composition is disclosed for removing smut formed on the surface of ferrous metals by common surface treatments such as pickling, cleaning, descaling and etching.

3,573,985
METHOD FOR CLEANING PIPELINES
Ronald W. Schultz, Lodgepole, Alberta Canada assignor to Western Decalta Petroleum Limited Calgary Alberta Canada
Filed Aug. 12, 1968, Ser. No. 751,844
Claims priority, application Canada, Aug. 15, 1967, 997,884
Int. Cl. B08b 9/04
U.S. Cl. 134—8 10 Claims

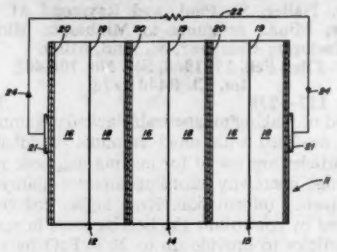
Procedure for cleaning pipelines which includes forcing a plurality of pipeline cleaning "pig" balls through the pipeline. Pipeline cleaning kit comprising a first lead "pig" ball and a second follower "pig" ball. The "pig" balls have a generally spherical main body formed of a resiliently deformable material which is provided with a plurality of discrete, discontinuous and laterally spaced apart protuberances upstanding from the surface thereof. In each case the protuberances have a hardness greater than that of the main body. In addition, the second or follower "pig" ball has a main body formed of a resiliently deformable material having a hardness greater than the hardness of the main body of the first or leading "pig" ball. The "pig" balls preferably are formed of natural or synthetic rubber, with the protuberances having a tip formed of a hard metallic substance such as tungsten carbide.

3,573,986
HEAT ACTIVATED CELL
Jacob Greenberg, Pepper Pike, Ohio, assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration
Filed Dec. 30, 1968, Ser. No. 787,911
Int. Cl. H01m 21/00, 17/06
U.S. Cl. 136—83 11 Claims



A heat activated electromotive force (EMF) cell having an anode formed of aluminum and a cathode comprising an oxidizing material such as sulfur. The cathode material is supported in a container or in a matrix such as porous carbon. An aluminum salt layer electrolyte such as AlCl separates the anode from the cathode. To minimize vaporization of the aluminum salt, an alkali halide salt may be mixed therewith. The cell may be operated at temperatures up to a point where either the cathode material or the electrolyte is molten.

3,573,987
ELECTROCHEMICAL ELECTRIC POWER GENERATOR
Milton A. Knight, Centreville, Va.
(P.O. Box 1288, Kissimmee, Fla. 32741)
Filed July 28, 1969, Ser. No. 845,372
Int. Cl. H01m 21/00
U.S. Cl. 136—83 12 Claims



An electrochemical power generator wherein each electrode is made of a liquid, the electrodes of each cell being separated by an ion exchange membrane, and the cells being separated by conducting current collectors.

3,573,988
ELECTRODE COMPRISING NON-NOBLE METAL DISULFIDES OR PHOSPHIDES AND ELECTROCHEMICAL CELL UTILIZING SAME
Douglas W. McKee, Burnt Hills, and Mun S. Pak, Stormville, N.Y., assignors to General Electric Company
Filed Dec. 23, 1968, Ser. No. 786,268
Int. Cl. H01m 13/00, 27/00
U.S. Cl. 136—86 5 Claims

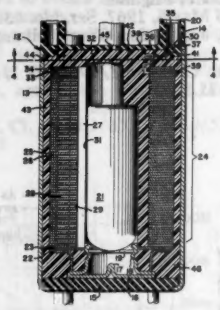
An electrode is composed of particles of a metallic disulfide, a metallic phosphide, or such particles coated with a non-noble metal bonded together with a binder, and an electrical lead in electrical contact with the bonded particles. The metallic component of the disulfide or the phosphide is selected from the class consisting of molybdenum, tungsten, zirconium, niobium, hafnium, and tantalum. This electrode, which does not contain any noble metal catalyst, is particularly useful in electrochemical cells employing alkaline electrolytes.

3,573,989
METHOD OF MANUFACTURING GALVANIC BATTERIES
Clark C. Cleveland, Bennington, Vt., assignor to the United States of America as represented by the Secretary of the Navy
Continuation-in-part of application Ser. No. 119,258, June 21, 1961. This application Sept. 10, 1964, Ser. No. 395,988
Int. Cl. H01m 1/00, 17/00
U.S. Cl. 136—90 8 Claims

1. An improved method of manufacturing a spin-filled reserve energizer having an annular stack of voltage cells for surrounding an electrolyte carrying frangible ampule and partially encased by a molding compound and housing therefore comprising the steps of:

sealing with vinyl plastisol a plurality of conductive connecting tabs extending from a plurality of connectors at the point where said tabs extend through apertures in a plurality of contact receiving means carrying said connectors and mounted on one end casing of said energizer; and

thereafter forcing a molding compound through an opening in said one end casing and into intimate contact with said annular stack and said vinyl plastisol whereby said plastisol is of sufficient strength to prevent extrusion of said molding compound through the aperture in each of said contact receiving means when said molding compound is applied to said vinyl plastisol under pressure.

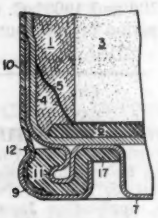


3,573,990

SEALED TYPE DRY CELL

Takashi Tsuchida, Kohei Hirukawa, Yukio Okajima, and Fumio Iguma, Shizuoka-ken, Japan, assignors to Fuji Denki Kagaku Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 12, 1970, Ser. No. 2,054
Claims priority, application Japan, Jan. 23, 1969, 44/5,461
Int. Cl. H01m *21/06*
U.S. Cl. 136—107 **6 Claims**



The structure of a battery dry cell includes a cup-shaped bottom member having an annular projection vertically projecting near its bottom circumference. The bottom member is fitted over a bottom surface of an anode zinc can. An annular gasket is fitted to the bottom member and a cavity in the gasket is fitted to the annular projection. A skirt portion of a plastic cylindrical jacket, which is bent along the gasket, is radially constricted against the gasket by means of a metal member.

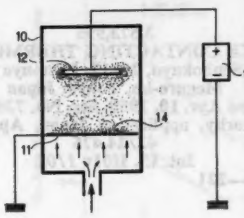
3,573,991

PROCESS FOR THE PREPARATION OF THIN ELECTRODES FOR FUEL CELLS

Pierre Lenfant, Les Grandes, Pierre-Jean Bono, Massy, Alexis Tissier, Sainte-Genevieve-des-Bois, and Robert Chevet, Chilly-Mazarin, France, assignors to Compagnie Generale d'Electricite, Paris, France

Filed May 20, 1968, Ser. No. 730,547
Claims priority, application France, May 18, 1967, 106,891; May 25, 1967, 107,849; Dec. 26, 1967, 133,769
Int. Cl. B05b *5/02*; B22f *7/00*; H01m *27/04*
U.S. Cl. 136—120 **12 Claims**

A process for the preparation of thin electrodes for fuel cells having at least one barrier layer situated on its electrolyte side in contact with a catalytically active layer including the steps of depositing a finely screened powder on a support by electrostatic projection to form the barrier layer; subjecting the layer to compression and sintering treatments; and depositing the catalytically active layer by similar process.



3,573,992

METHOD OF FORMING AN ELECTRODE

Willard T. Grubb, Schenectady, and Robert A. Macur, Burnt Hills, N.Y., assignors to General Electric Company

Filed Aug. 29, 1968, Ser. No. 756,120
Int. Cl. H01m *13/00, 27/00*
U.S. Cl. 136—120 **6 Claims**

Methods are described for forming electrodes by metallic deposition from a solution containing platinum, palladium and selected third metal onto a porous substrate having at least a non-noble metal coating. The metallic deposition is accomplished by substrate immersion, substrate dipping, or substrate immersion in which the substrate is connected to the positive terminal of a power supply. Such electrodes provide high performance anodes for electrochemical cells.

3,573,993

OXYGEN ELECTRODE COMPOSED OF MIXED OXIDES OF PRASEODYMIUM, CHROMIUM, NICKEL AND COBALT

Wilfried Pabst, Pittsburgh, Pa., and Gerd Sandstede, Frankfurt am Main, and Gerhard Walter, Steinbach, Taunus, Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Dec. 4, 1968, Ser. No. 780,991
Claims priority, application Germany, Dec. 23, 1967, P 16 71 721.8
Int. Cl. H01m *13/00, 27/00*
U.S. Cl. 136—120 **9 Claims**

Oxygen electrode suitable as cathode in fuel cells. Mixed oxides of praseodymium, chromium, nickel and/or cobalt are lodged in spaces formed on the surface of the solid electrode material and the electrical conductor of the electrode is made of heat resistant steel.

3,573,994

LIQUID PERMEABLE LIQUID ABSORBENT POROUS SHEET MATERIALS

Braham Rowley Field, Redditch, England, assignor to Alkaline Batteries Limited, Redditch, England

No Drawing. Filed Jan. 31, 1968, Ser. No. 701,856
Int. Cl. H01m *3/02*; B32b *5/16*
U.S. Cl. 136—145 **5 Claims**

A material suitable for use in separators for the plates of alkaline storage batteries is made by sintering a felt containing about 90% fibre and 10% powder, of which about half the fibre is nylon staple and about half regen-

erated cellulose, and of which about a third of the powder is powdered nylon, the remainder being cellulose powder and inert filler powder.

3,573,995
SURFACE CONTACTING THERMOCOUPLE
Tsuneji Senbokuyo, 23–17, Himonya 5-chome, Meguro-ku, Tokyo, Japan
Filed Apr. 10, 1968, Ser. No. 720,149
Claims priority, application Japan, Apr. 19, 1967, 42/24,476
Int. Cl. H01v *1/02*
U.S. Cl. 136—221 6 Claims

A surface contacting thermocouple is comprised of thermocouple and a spring mechanism; the thermocouple comprises a curved outwardly projected thin band-like thermocouple wire supported by the spring mechanism, and is arranged to adhere the thermocouple closely to the surface whose temperature is to be measured.

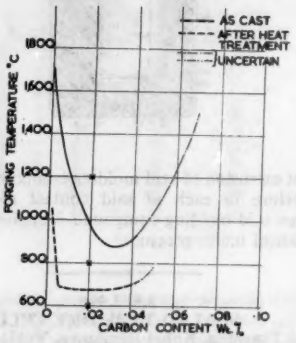
3,573,996
SILICIDE COATINGS FOR REFRACTORY METALS
T. O. Paine, Deputy Administrator of the National Aeronautics and Space Administration, in respect to an invention of Ray T. Wimber, Bozeman, Mont., and Alvin R. Stetson, and Arthur G. Metcalfe, both of San Diego, Calif.
No Drawing. Filed Aug. 8, 1968, Ser. No. 751,061
Int. Cl. C23c *9/00, 11/06*
U.S. Cl. 148—6 20 Claims

A silicide coating process in which a modifier alloy is slurry applied and vacuum sintered onto a substrate preparatory to siliciding.

3,573,997
PROCESS FOR THE COATING OF METAL
Elmer H. Plaxton, Bloomfield Hills, Mich., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.
No Drawing. Continuation-in-part of applications Ser. No. 378,982 and Ser. No. 378,946, both filed June 29, 1964. This application Dec. 31, 1968, Ser. No. 789,005
Int. Cl. C23f *7/10, 7/14, 7/26*
U.S. Cl. 148—6.16 7 Claims

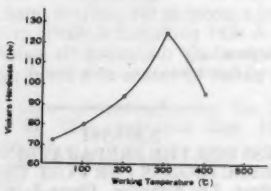
A process for coating metal wherein a phosphate or oxalate conversion coating composition is applied to an aluminum, zinc or ferrous metal surface to form a substantially dry, uniform phosphate or oxalate conversion coating, a portion of which is water-soluble. An organic containing, reducing and/or esterifying fixing or immobilizing coating composition is then applied which reacts out the water-soluble portion of the conversion coating to produce water-insoluble phosphates or oxalates and form a substantially dry, uniform composite coating. A hexavalent chromium containing stabilizing or passivating composition is also applied, either as a separate stage or, preferably, by including the hexavalent chromium material in the fixing coating composition. Preferably, all of the coating materials are applied by "mist-on" type spray applications.

3,573,998
METHOD OF HEAT-TREATING TUNGSTEN-BASE ALLOYS
Robert Walter Broomfield, Sutton Coldfield, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England
Filed May 8, 1967, Ser. No. 636,835
Claims priority, application Great Britain, May 17, 1966, 21,818/66
Int. Cl. C21d *1/00;* C22f *1/18*
U.S. Cl. 148—11.5 5 Claims



A method of heat-treating tungsten-base alloys containing about 0.005 to about 0.0490 carbon and optionally molybdenum, tantalum, niobium and zirconium to render the alloy forgeable below 1100° C., in which the alloy is heated between 1700 and 1900° C. and cooled at a constant rate over a period of one hour to a temperature of 900° C.

3,573,999
MECHANICAL STRENGTH OF METALS
Isao Gokyu, Musashinoshi, Tokyo, Japan, assignor to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 26, 1966, Ser. No. 594,348
Claims priority, application Japan, Oct. 30, 1965, 40/66,312
Int. Cl. C21d *7/10*
U.S. Cl. 148—12 5 Claims

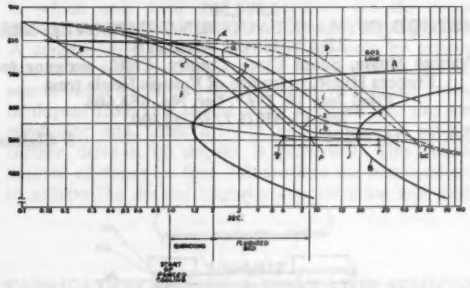


A method for improving the mechanical and physical properties of alpha iron steel bar and rod articles by plastically twisting the articles without dimensional deformation between about 200° C. and about 400° C. The steel bar and rod articles are required to have interstitial solute atoms selected from the group consisting of carbon and nitrogen in an amount of at least 0.02% carbon and at least 0.008% nitrogen.

3,574,000
HIGH FLEXIBILITY STEEL WIRE AND METHOD OF TREATING SAME

Hans Geipel, Oberhausen-Sterkrade, Eckehard Foster, Oberhausen, and Wilfried Heinemann, Dinslaken, Germany, assignors to Firma Huttenwerk Oberhausen AG, Oberhausen, Germany

Continuation-in-part of applications Ser. No. 675,522, Oct. 16, 1967, and Ser. No. 750,642, Aug. 6, 1968. This application Feb. 17, 1969, Ser. No. 805,941
Claims priority, application Germany, Feb. 15, 1968, P 15 83 986.8
Int. Cl. C21d *1/62, 7/14, 9/57*
U.S. Cl. 148—12 6 Claims



Steel wire coming hot from a rolling mill is rapidly cooled, preferably with the aid of a fluidized bed, to a temperature between about 500° and 550° where transformation of austenite to pearlite takes place, the final phase of this transformation taking place substantially isothermally. This wire, when drawn to a fraction of its original diameter, manifests a microcrystalline structure with distinct lamellate zones and has improved torsional and flexural capacity compared with lead-patented and air-patented wires.

3,574,001
HIGH CONDUCTIVITY COPPER ALLOYS

Elmars Ence, Hamden, Conn., assignor to Olin Mathieson Chemical Corporation

No Drawing. Continuation-in-part of application Ser. No. 581,715, Sept. 26, 1966. This application May 16, 1968, Ser. No. 729,501
Int. Cl. C22c *9/00*
U.S. Cl. 148—32.5 5 Claims

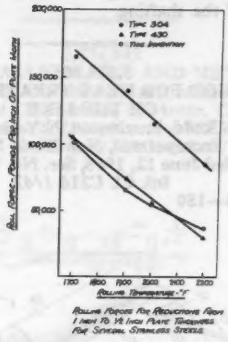
New and improved copper base alloys combining high conductivity with good strength, with the composition consisting essentially of from 0.1 to 2.5% chromium, 0.01 to 0.5% phosphorus, from 0.001 to 0.25% boron and the balance essentially copper, with the chromium boron and phosphorus precipitated throughout the copper matrix in a fine, uniform dispersion.

3,574,002
STAINLESS STEEL HAVING IMPROVED CORROSION AND FATIGUE RESISTANCE

Howard Wayne Hayden, Jr., Suffern, N.Y., Robert Cameron Gibson, Cupsaw Lake, Ringwood, N.J., and Jere Hall Brophy, Suffern, N.Y., assignors to The International Nickel Company, Inc., New York, N.Y.

Continuation-in-part of application Ser. No. 638,519, May 15, 1967, which is a continuation-in-part of application Ser. No. 559,185, June 21, 1966. This application Aug. 1, 1968, Ser. No. 749,409
Int. Cl. C22c *39/14, 39/20*
U.S. Cl. 148—37 19 Claims

Directed especially to readily workable stainless steels having a duplex, e.g., austenite-ferrite, microstructure containing about 18% to about 35%, e.g., about 26%, chromium, about 2% to about 12%, e.g., about 6.5%, nickel, up to about 1.5%, e.g., about 0.2%, titanium, up to about 1% vanadium, not more than about 0.08%,

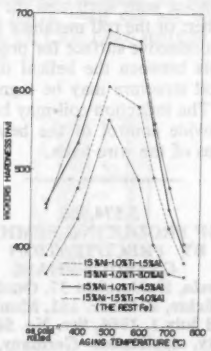


e.g., up to about 0.05%, carbon and the balance substantially iron.

3,574,003
METHOD OF TREATING SEMI-HARD MAGNETIC ALLOYS

Tomisaburo Nara, Yukio Kiyotani, Mutsuo Tokuyoshi, and Huzio Hirabayashi, Tokyo, Japan, assignors to Nippon Telegraph and Telephone Public Corporation, Tokyo, Japan

Filed Oct. 9, 1967, Ser. No. 673,714
Claims priority, application Japan, Oct. 14, 1966, 41/67,216; Mar. 10, 1967, 42/14,729
Int. Cl. H01f *1/00*
U.S. Cl. 148—120 7 Claims



Semi-hard magnetic alloy of a composition consisting of 1 to 20%, by weight, of Ni, 0.5 to 4.5%, by weight, of Al, 0.5 to 3%, by weight, of Ti, 0.01 to 5%, by weight, of Cu, if desired, and the rest of Fe. The alloy is heated to a temperature ranging from 300° C. to 900° C., cooled to a temperature below 300° C., and then cold rolled at a reduction rate of from 10 to 70% to further improve its magnetic characteristics.

3,574,004
PROCESSING OF GAS TURBINE ENGINE SHAFTING

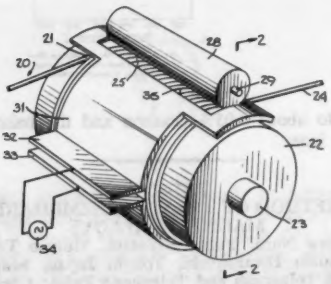
John E. Flynn, Glastonbury, Conn., assignor to United Aircraft Corporation, East Hartford, Conn.

No Drawing. Filed Mar. 20, 1969, Ser. No. 809,040
Int. Cl. C21d *1/00*
U.S. Cl. 148—127 4 Claims

Bi-metal gas turbine engine shafting, formed at one end from a high fatigue strength, creep limited low alloy steel

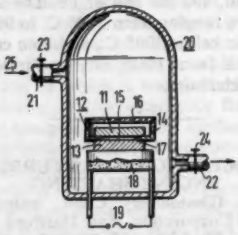
such as AMS 6340, and at the other end from a high creep strength age-hardenable nickel base alloy such as Inconel 718, is heat treated in an unconventional cycle to attain and preserve the advantageous mechanical properties at both ends of the shafting.

3,574,005
METHOD FOR HEAT TREATING WIRE OR THE LIKE
Wallace C. Rudd, Larchmont, N.Y., assignor to AMF Incorporated, New York, N.Y.
Filed June 12, 1968, Ser. No. 736,415
Int. Cl. C21d 1/42
U.S. Cl. 148—150 **4 Claims**



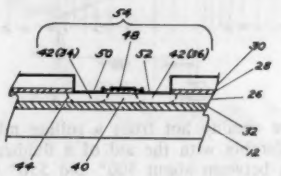
Various arrangments and methods are described for electrically heating a rapidly traveling wire as it proceeds along a helical path around a guide roll. A pressure roll structure cooperates with the guide roll to maintain adjacent turns of the helix in intimate contact where required or in contact with itself and the guide roll. One, or both, or neither, of the roll members may have at least an electrically conductive surface for providing a path for bridging currents between the helical turns of the wire. The pressure roll structure may be segmented and floatingly mounted. The induction coil may be non-uniform in diameter to provide control of the heat generated over different portions of the wire helix.

3,574,006
METHOD OF PRODUCING SEMICONDUCTOR LAYERS BY PRECIPITATION FROM THE GASEOUS PHASE
Hansjürgen Dersin, Haidgraben 37, Ottobrunn, Germany, and Erwin Früchte, Balanstr. 151, Munich 9, Germany
Filed July 1, 1966, Ser. No. 562,382
Claims priority, application Germany, July 1, 1965, S 97,931
Int. Cl. H01l 7/36
U.S. Cl. 148—174 **10 Claims**



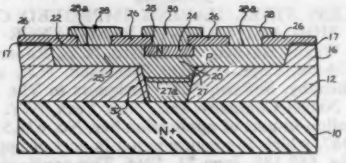
The invention relates to a method for producing semiconductor layers of the same or variable conductance type and/or variable conductivity by precipitating from a gaseous phase upon a monocrystalline carrier body of the same or similar lattice structure. The invention prevents, during the precipitation of the semiconducting layers upon the carrier body, the edges of the carrier discs, which are particularly affected by the action of the reaction gas, from being brought into the growth layer which is comprised of another material. This is achieved by the carrier body for epitactic precipitation being provided on all sides, but at least at the edges, with a protective covering which leaves free only that part of the surface upon which the semiconductor layer is to be precipitated.

3,574,007
METHOD OF MANUFACTURING IMPROVED MIS TRANSISTOR ARRAYS
Frances Hugle, Santa Clara County, Calif., assignor to Frances Hugle, as trustee of Francis Hugle trust
Filed July 19, 1967, Ser. No. 654,605
Int. Cl. H01l 7/36, 11/00
U.S. Cl. 148—175 **5 Claims**



A process for producing a large plurality of MIS devices, which may also be associated with simultaneously produced circuit elements to form integrated circuits. A non-single crystal substrate receives a thin layer of semiconductor in an epitaxial reactor, a thinner layer of a first insulating material, a thicker layer of a second insulating material, selective etching of these insulating materials, the formation of junctions by diffusion through etched areas, and a metallic coating deposited and etched to provide connections. Plural reactor steps are successively taken to minimize contamination of the product.

3,574,008
MUSHROOM EPITAXIAL GROWTH IN TIER-TYPE SHAPED HOLES
Edward J. Rice, Los Angeles, Calif., assignor to TRW Semiconductors, Inc., Lawndale, Calif.
Filed Aug. 19, 1968, Ser. No. 753,643
Int. Cl. H01l 7/36, 5/00
U.S. Cl. 148—175 **15 Claims**



A structure formed by, and a process for growing epitaxial layers of silicon on an exposed surface of a silicon wafer through openings in a passivating structure having a predetermined "tier-type" configuration. The

devices formed by this method have improved breakdown voltage characteristics. Further, the method makes possible the ability to vary and control junction capacitance as required.

3,574,009

CONTROLLED DOPING OF SEMICONDUCTORS

George Chizinsky, Beverly Farms, and Edward Simon, Manchester, Mass., assignors to Unitrode Corporation, Watertown, Mass.

Filed Mar. 6, 1968, Ser. No. 710,896
Int. Cl. H01l 7/34
U.S. Cl. 148—187 10 Claims

A method for controllably doping a semiconductor body in which only time and temperature are the process parameters controlled to achieve intended doping profiles. A concentration of dopant determined only by temperature is formed on a semiconductor surface to act as a source layer for subsequent diffusion. A selected amount of dopant from this source layer is driven into the semiconductor and, after drive-in of the selected amount, further drive-in of dopant is prevented. This selected amount of dopant is then diffused into the semiconductor to achieve the desired impurity concentration and depth.

3,574,010

FABRICATION OF METAL INSULATOR SEMICONDUCTOR FIELD EFFECT TRANSISTORS

George A. Brown, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 30, 1968, Ser. No. 787,769
Int. Cl. H01l 7/34, 7/36
U.S. Cl. 148—187 8 Claims

A process of fabricating a MISFET in which a pair of spaced apart doped silicon dioxide bodies is formed on the surface of a silicon substrate. A layer of silicon nitride is formed over the surface of the bodies and the substrate and the portion of the layer in the space between the blocks is removed. A thin layer of the silicon substrate is then removed from the space between these bodies and a relatively thin silicon dioxide layer is formed on the silicon substrate in this space. A second layer of silicon nitride is then formed over the first silicon nitride layer and the silicon dioxide layer thereby to form a dielectrc region for the gate of the transistor. Thereafter source and drain regions are formed by diffusing impurities from the doped silicon blocks into underlying portions of the silicon substrate thereby forming source and drain regions, the silicon nitride layers preventing out-diffusion of the dopant from the doped bodies and the second silicon nitride layer covering any gaps between the silicon dioxide layer in the gate region between the silicon dioxide layer and the first silicon layer.

3,574,011

AQUEOUS SLURRIED EXPLOSIVE OF IMPROVED POURABILITY CONTAINING A POLYACRYLAMIDE THICKENER AND SODIUM PERCHLORATE

Herbert K. Knight, Jr., Flanders, N.J., assignor to Hercules Incorporated, Wilmington, Del.

No Drawing. Continuation-in-part of application Ser. No. 694,097, Dec. 28, 1967. This appplication Dec. 16, 1968, Ser. No. 784,210
Int. Cl. C06b 11/00
U.S. Cl. 149—70 20 Claims

Inorganic oxidizer salt explosive compositions of the aqueous slurry type having improved low temperature flow properties are provided, which contain a polyacrylamide thickener system in combination with 50–90 weight percent total aqueous phase, sodium perchlorate as at least 75 percent of the total inorganic oxidizer salt, and said aqueous phase containing said sodium perchlorate dissolved therein in a weight ratio to water of from 1:1 to 1.5:1.

3,574,012

TRIMETALLIC MASKS AND METHOD

Mortimer Penberg, Claremont, Calif., assignor to Aerojet-General Corporation, El Monte, Calif.

Filed Jan. 6, 1969, Ser. No. 789,291
Int. Cl. B23p 3/20; C23f 1/00
U.S. Cl. 156—3 20 Claims

A trimetallic mask according to this disclosure comprises a base having coarse apertures formed therein. A thin film layer of fine grain metal is bonded to the base by an intermediate thin film of noble metal. Fine apertures are formed in the fine grain layer.

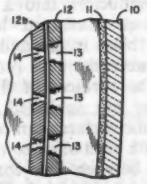
The mask is formed by depositing a thin film of noble metal onto a surface of the base and thereafter depositing a thin film of fine grain metal onto the noble metal layer. Coarse apertures are selectively etched in the base and fine apertures are selectively etched in the fine grain thin film.

3,574,013

APERTURE MASK FOR COLOR TV PICTURE TUBES AND METHOD FOR MAKING SAME

John J. Frantzen, North St. Paul, Minn., assignor to Buckbee-Mears Company, St. Paul, Minn.

Filed Jan. 6, 1969, Ser. No. 789,264
Int. Cl. C23f 1/00; H01j 29/18
U.S. Cl. 156—8 7 Claims



Aperture masks for color TV picture tubes are formed initially with the hole partially closed for use in laying down phosphor dot patterns on the tube screen after which the holes are opened for normal operation of the mask as part of the finished tube.

3,574,014

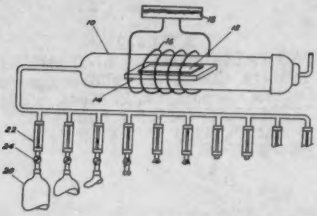
MASKING TECHNIQUE FOR SELECTIVE ETCHING

Frances Hugle, Santa Clara, Calif., assignor to Frances Hugle, as trustee of Frances Hugle trust

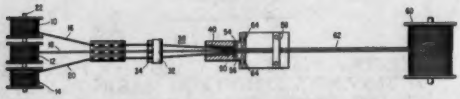
Filed July 24, 1967, Ser. No. 655,456
Int. Cl. H01l 7/44, 7/50
U.S. Cl. 156—17 7 Claims

A process for forming a pattern in a dielectric layer by depositing the layer upon a semiconductor at elevated temperature from a gas, depositing a layer of metal over that by changing the gas while keeping the work in the same chamber, removing the layer of metal by a beam of

energy (such as an electron or a laser beam) where the dielectric layer is to be formed into a pattern, and etching the dielectric layer by an etch that is effective upon that layer but not effective upon the layer of metal.



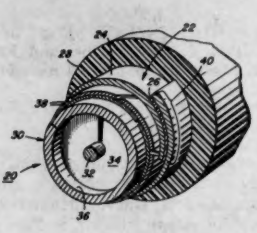
3,574,015
METHOD AND APPARATUS FOR JOINING CONDUCTORS
James Clark Blee, R.R. 9, 8687 Notestine Road, Fort Wayne, Ind. 46805
Filed May 8, 1967, Ser. No. 636,989
Int. Cl. H01b *13/00*
U.S. Cl. 156—47 **9 Claims**



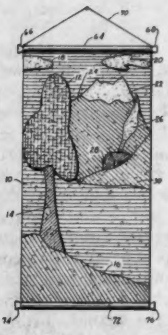
A plurality of resin bonded conductors are passed continuously from supply reels into converging paths after passing through straighteners and devices which are used for aligning the conductors into a single plane. After the conductors have converged by a predetermined amount, a hot air blast is directed transversely to the conductors and between the gaps provided between adjacent conductors. The surfaces of the conductors which confront each other are subjected to localized intense heating and before the surfaces can cool, they are brought into light contact with each other so that there is a tangential weld bonding between the conductors, forming a continuous, welded seam which holds the conductors together in the form of a cable. None of the insulation is removed from the imbedded conductor material, nor is the insulation distorted.

3,574,016
METHODS OF FORMING SEAMS IN MOISTURE BARRIERS FOR CABLES
Roger R. Wahlberg, Bloomfield, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.
Original application Oct. 20, 1967, Ser. No. 676,770. Divided and this application Apr. 1, 1969, Ser. No. 836,182
Int. Cl. H01b *13/10*
U.S. Cl. 156—54 **6 Claims**

A communications cable sheath is provided with a sealed metallic barrier to prevent moisture diffusion into transmission components of the cable. The barrier is formed of a longitudinally applied metallic strip in which a resultant overlapped seam is sealed with an acrylic acid-ethylene copolymer that has been inserted into the seam, in tape form, and subsequently heated by the extrusion of a thermoplastic sheath over the metallic strip or, in the alternative, is heated by passing the formed metallic strip and the associated transmission components through an induction type or other appropriate heating device. An alternate embodiment involves a cable sheath in which the copolymer is applied as a precoating on the inside surface of the metallic strip. Heat transfer from the thermoplastic extrusion operation to the overlapped seam can take place without encountering an insulating barrier of the copolymer. The latter embodiment can be practiced with virtually no change to conventional cable sheathing equipment and apparatus.

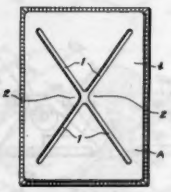


3,574,017
ORNAMENTAL SYSTEM
David Kass, 5 Schenk Ave., Great Neck, N.Y. 11020
Filed Apr. 9, 1969, Ser. No. 814,713
Int. Cl. B44c; B32b *3/16*
U.S. Cl. 156—63 **17 Claims**



An ornamental system including a plurality of components which are formed into a pictorial design or pictorial composition, preferably for use as a wall hanging assembly, is provided. The system includes four main components which are joined in a prescribed manner during the formation of the pictorial composition. The components may be provided with indicia of one kind or another for a proper matching thereof to assist in the assembly operation. One such indicia is the use of outline shapes of the individual objects which form a part of the final pictorial composition. The outline shapes are printed on an object forming guide member to assist in the accurate formation of an object. After formation, the several objects are placed on a guide sheet which is used to precisely position the variously shaped objects. A background unit is also included, and it is upon this unit that the properly positioned objects are transferred from the guide sheet to form the completed pictorial composition.

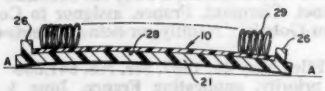
3,574,018
CASE FOR SMALL ARTICLES AND METHOD OF MANUFACTURING THE SAME
Atsumi Fujisawa, 26–13 Asakusa 2-chome, Taito-ku, Tokyo, Japan
Filed Sept. 26, 1967, Ser. No. 670,675
Claims priority, application Japan, Sept. 27, 1966, 41/63,383
Int. Cl. A44b *19/34*
U.S. Cl. 156—66 4 Claims



A case for small articles comprises a pair of superposed sheets of flexible, heat sealable, synthetic resin heat sealed to each other along their peripheral edges. One of the sheets has a substantially rectangular opening therein while the other sheet is substantially imperforate. A pad board of relatively thick paper, formed with a score line or lines extending along its longitudinal center line is inserted into the resultant bag, and may have a sheet of synthetic resin along its unscored surface. A separable slide fastener is secured around the periphery of the opening in the one sheet, and an inner lining of flexible synthetic resin is placed over the pad board. The case may be folded about the score lines of the pad board, and the separable slide fastener closed.

In one embodiment of the invention, the two initially superposed sheets have their heat sealed edges inturned by turning the "bag" inside out after cutting two diagonally intersecting slits in the surface of one sheet to form four substantially triangular tabs. In the other embodiment of the invention, the heat sealed edges of the original sheets are covered by an edge tape heat sealed to one of the sheets and turned back on itself to overlap the other sheet, the inner periphery of this edge tape defining the aforementioned opening.

3,574,019
METHOD OF MAKING A LAMINATED FASTENING DEVICE
Laurent H. Girard, Bedford County, N.H., assignor to American Velcro, Inc.
Original application Oct. 7, 1966, Ser. No. 585,023, now Patent No. 3,391,434. Divided and this application Aug. 23, 1968, Ser. No. 749,891
Int. Cl. A41h *43/00*
U.S. Cl. 156—66 6 Claims



A method of making a fastening device by extruding plastic as a substantially rectangular strip having a concave base and a convex surface cooling the extruded strip. A tape member is coated on its under surface with a thermoplastic; the opposite surface of the tape member has a plurality of hooking elements extending therefrom. The thermoplastic adhesive is then heated and the adhesive coated surface of the tape fastener is combined with the convex surface of the cooled vinyl strip and passed through complementary concave-convex pressure rolls tailored to the form of the extruded strip to achieve an adhesive bond along the entire curved surface.

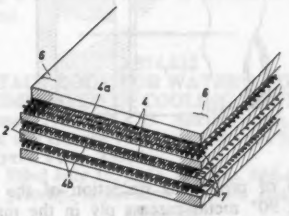
3,574,020
METHOD OF EMBOSSING VINYL-COATED FABRICS
Reuben Wisotzky, Lexington, Mass., assignor to Pandel, Inc., Lowell, Mass.
No Drawing. Filed Apr. 27, 1970, Ser. No. 32,383
Int. Cl. B32f *31/22*
U.S. Cl. 156—79 10 Claims

A method of providing a variety of embossing designs on a thermoplastic resin-coated fabric material from a single embossing roll surface is provided by interposing one or more thin sheet materials having a different modulus of elasticity than the material to be embossed between the surface of the thermoplastic resin material to be embossed and the embossing surface and during the embossing controlling the tension of the interposed sheet material, thereby providing a variety of surface design effects from a single embossing surface.

3,574,021
PROCESS FOR MAKING A THREE-LAYER POROUS LEATHER SUBSTITUTE
Edward C. Van Buskirk, South Bend, Ind., assignor to Uniroyal, Inc., New York, N.Y.
No Drawing. Continuation-in-part of application Ser. No. 340,497, Jan. 27, 1964. This application Feb. 26, 1969, Ser. No. 802,636
Int. Cl. B23b *5/18*
U.S. Cl. 156—79 6 Claims

A novel, breathable, leather-like three-layer laminate is produced having a fabric backing layer, an intermediate breathable sponge layer and an upper breathable surface layer by a method in which a substantially uniform mixture of a fluid organic plastic film forming material and a meltable material incompatible therewith is formed into a thin surface layer, there is formed on the thin layer a thicker body layer from a substantially uniform mixture of a fluid organic plastic film forming material containing a meltable material incompatible therewith and a blowing agent, with said incompatible meltable material in each said layer being in a physical form having a bulk density less than its actual density, a fabric is applied to the body layer, the film forming material in the two layers is formed into a unitary film bonded to the fabric, the body layer is sponged by decomposing a blowing agent, and the incompatible material in the two layers is melted after a matrix has been formed of the two layers.

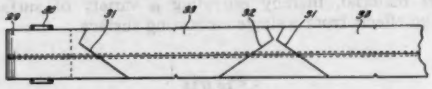
3,574,022
CONVEYING OR DRIVING BELT AND METHOD FOR MAKING SAME
Walter Rudolf Lampert, Hamburg, Germany, assignor to H. Rost & Co., Hamburg, Germany
Filed Feb. 19, 1968, Ser. No. 706,347
Claims priority, application Germany, Feb. 23, 1967, R 45,354
Int. Cl. D06c *25/00*
U.S. Cl. 156—88 14 Claims



A multi-layer conveyor or drive belt and a process of manufacturing the multi-layer belt which comprises utilizing a plurality of alternate fabric sheets and bonding

material sheets or utilizing fabric sheets coated or treated with a bonding material, the fabric sheets being formed with wefts of fabrics, body warps of fabric and peripheral warps of a material which upon lamination of the sheets will fuse with the bonding material.

3,574,023
PROCESS FOR MAKING COMPOSITE, IN-COLLAR BLANKS
Francis J. Dickenherr, Cincinnati, Ohio, assignor to Palm Beach Company, Cincinnati, Ohio
Filed July 11, 1968, Ser. No. 744,093
Int. Cl. B32b *7/08*
U.S. Cl. 156—93 1 Claim

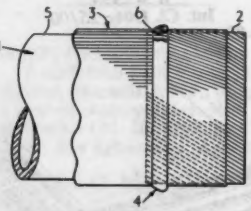


A continuous process for making in-collar blanks from separate strips of inner collar felt material and two interliner strips including fusion of the felt material to the interliner strips to form a composite, in-collar strip and the step of blanking out inner collar forms from the composite, in-collar strip.

3,574,024
METHOD OF BONDING A WINDOW TO THE WINDOW OPENING IN A VEHICLE
Alan D. Rose, Oadby, England, assignor to Bitumen Industries Limited, Slough, Buckinghamshire, England
Continuation-in-part of application Ser. No. 531,599, Mar. 3, 1966, which is a continuation-in-part of application Ser. No. 359,097, Apr. 13, 1964. This application Feb. 4, 1969, Ser. No. 796,447
Int. Cl. B60j *1/02*
U.S. Cl. 156—108 10 Claims

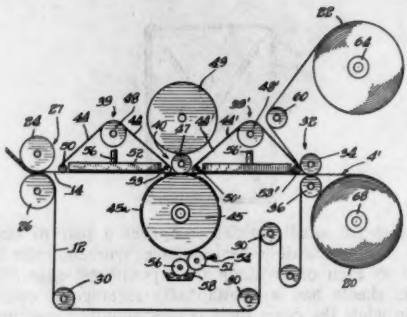
This invention relates to a method and means for bonding windows into automobile bodies. A bonding strip comprising a curable synthetic polymeric material having an electrical conductor running therethrough is used.

3,574,025
METHOD OF MANUFACTURING PNEUMATIC TIRES
John F. Askam, Sutton Coldfield, England, assignor to The Dunlop Company Limited, London, England
Filed Nov. 27, 1968, Ser. No. 779,390
Claims priority, application Great Britain, Dec. 1, 1967, 54,829/67
Int. Cl. B29h *17/22*
U.S. Cl. 156—124 3 Claims



A method of preventing distortion of the turned-up portion of a 90° metal carcass ply in the manufacture of a pneumatic tire provided with a filler of bias laid metal cords comprising off-setting the cord ends of the carcass ply before turn-up to compensate for the distortion.

3,574,026
METHOD AND APPARATUS FOR FABRICATING LABEL STOCK
Leo Kucheck, Chicago, Ill., assignor to Compac Corporation, New York, N.Y.
Filed Aug. 23, 1966, Ser. No. 574,373
Int. Cl. B32b *31/18*
U.S. Cl. 156—152 8 Claims

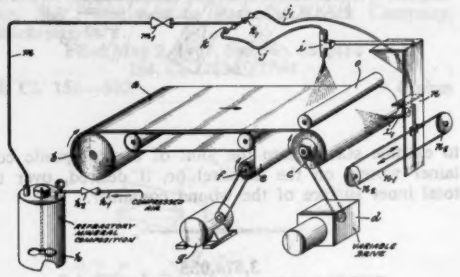


This invention relates to an apparatus and a method for manufacturing label stock of the type including a backing strip having separated longitudinally spaced printed labels thereon secured to the backing strip by a layer of pressure sensitive adhesive coating on the inner unprinted side of the labels. The completed label stock is usually wound into rolls for convenience in handling, storage and shipment to the ultimate user. The user places the rolls of label stock on a label applying machine and threads an unwound end of the roll through a label applying head of the machine. The label applying machine dispenses labels automatically one at a time from the backing strip as an article is moved to a labeling station of the machine. The labels readily peel from the backing strip by passing the backing strip around a sharply angled plate called a peeler plate. The rigidity of the labels causes the labels to peel from the backing strip at the point where the backing strip bends sharply back at the tip of the peeler plate. The peeled labels are received one at a time by the label applying head of the label applying machine with the pressure sensitive adhesive coated sides thereof facing away from the head which then applies each label to an article delivered to the labeling station of the machine.

3,574,027
METHOD OF MANUFACTURING HEAT INSULATING PRODUCTS, SUCH AS SHELLS
Alain Bonnet, Clermont, France, assignor to Compagnie de Saint-Gobain, Neuilly-sur-Seine, Hauts-de-Seine, France
Filed May 26, 1967, Ser. No. 641,686
Claims priority, application France, June 3, 1960, 64,054
Int. Cl. B65h *81/02*
U.S. Cl. 156—191 8 Claims

The invention concerns the production of laminated bodies of insulation from a mat of mineral fibers which is impregnated with a polymerizable synthetic resin and additions of refractory mineral compositions to control the cellular structure of the bodies and their consequent insulating properties following the heating thereof. More particularly, the invention contemplates the production of cylindrical insulating shells for pipes or conduits subjected to high temperatures by winding a plurality of layers of a mat of glass fibers having an unpolymerized

resin interspersed therethrough, while spraying onto the mat, before and/or during the winding operation, an aqueous dispersion of a refractory mineral composition in controlled amounts. The subsequent heating of the mandrels bearing the spirals of the mat, results in the polymerization of the resin and the vaporization of the

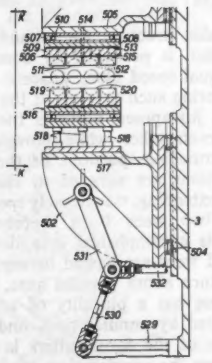


water component of the dispersion, leaving a body of glass fibers bound together by a hardened polymerized resin and also by a skeletal framework of bonds of hardened refractory material, the density of which increases relatively to the fibers from the exterior of the shell to the interior thereof, whereat the maximum heat-insulating effects are desired.

3,574,028
METHOD FOR THE ALIGNMENT OF PARTS OF ARTICLES

Norman Ashcroft Hurst, Four Oaks, Thomas Edward Horace Gray, Sutton Coldfield, and James Jones-Hinton, Tanworth-in-Arden, England, assignors to Dunlop Rubber Company Limited, London County, England

Filed Dec. 14, 1966, Ser. No. 601,625
Claims priority, application Great Britain, Dec. 15, 1965, 53,344/65
Int. Cl. B29c *27/04*
U.S. Cl. 156—228 **3 Claims**

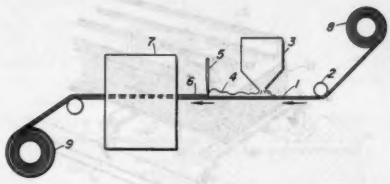


A method for accurately relatively aligning parts of articles from an initially substantially aligned position utilising accurately relatively positioned locating means for each of the parts, and separating the locating means carrying the parts to allow relative movement to take place between the locating means and the parts, in the separated position, resulting in accurate alignment of parts and locating means.

3,574,029
METHOD OF PRODUCING MULTI-LAYER TRANSFERABLE CASTINGS

Kitty S. Ettre, Norwalk, Conn., assignor to Spears, Inc., Stamford, Conn.

Continuation-in-part of application Ser. No. 377,998, June 25, 1964. This application Apr. 4, 1968, Ser. No. 718,709
Int. Cl. B44c *1/16*; B41m *3/12*; B28b *19/00*
U.S. Cl. 156—231 **9 Claims**



A process for making a multiple-layer transferable unfired casting supported on a temporary substrate. The layers are separately cast on temporary substrates and are then brought together and bonded, after which one of the temporary substrates is stripped away. The resulting multiple-layer casting can be transferred to a permanent substrate and fired.

3,574,030
METHOD OF MAKING FLEXIBLE GLASS LAMINATES

Alexander H. Callander, Big Flats, N.Y., and Kenneth E. Kolb, Peoria, Ill., assignors to Corning Glass Works, Corning, N.Y.

Continuation-in-part of application Ser. No. 186,433, Apr. 10, 1962. This application July 22, 1968, Ser. No. 746,675
Int. Cl. B29b *3/02*; B32b *7/02, 17/10*
U.S. Cl. 156—244 **20 Claims**

This invention relates to a method of making a thin flexible laminated structure formed of a thin glass sheet having a thickness of less than about 0.005 inch and at least one thin sheet of flexible non-vitreous material permanently adhered or bonded to the glass sheet.

3,574,031
METHOD OF HEAT WELDING THERMOPLASTIC BODIES USING A STRATUM OF SUSCEPTOR MATERIAL

William C. Heller, Jr., 3521 N. Shepard Ave., Milwaukee, Wis. 53211, and Alfred F. Leatherman, Columbus, Ohio; said Leatherman assignor to said Heller

Filed Mar. 24, 1967, Ser. No. 625,650
Int. Cl. B29c *27/02*
U.S. Cl. 156—273 **13 Claims**

The present invention relates generally to improvements in the art of heat welding or sealing thermoplastic materials, and relates more particularly to an improved method of sealing thermoplastics through use of a material containing a susceptor which is utilized to generate the sealing heat.

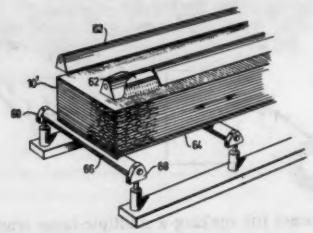
3,574,032
CONTACT BODY FOR WATER AND AIR AS EMPLOYED IN COOLING TOWERS

Per Gunnar Norback, 33 Askrikevagen, Lidingo 1, Sweden, and George W. Meek, 1205 6th St., Page Park, Fort Myers, Fla. 33901

Filed July 15, 1966, Ser. No. 565,483
Claims priority, application Sweden, Jan. 26, 1966, 1,040/66
Int. Cl. B31f *1/20*; B32b *3/02, 7/14*
U.S. Cl. 156—291 **3 Claims**

This disclosure provides a method of preparing corrugated, non-metallic layer elements for use in the production of a contact body for gas and liquid. An adhesive

material having adhesive characteristics effective to be reactivated by change in surrounding atmospheric conditions is used in the method of this invention. The adhesive material is applied to at least a portion of the corrugations at a plurality of points of contact for adjacent layer elements to be used in a contact body for gas and liquid. The adhesive material is subsequently dried to a solid, non-adhesive condition to form an intermediate article of



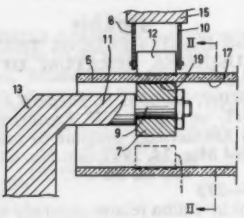
manufacture. This intermediate article of manufacture may be subsequently stored or assembled in the field to form a contact body for gas and liquid. Once the intermediate articles have been stacked appropriately with respect to each other, the adhesive material is reactivated to cause the adjacent sheet elements to adhere thereto. Subsequent resolidification of the adhesive material effects the production of the desired contact body.

3,574,033

METHOD OF APPLYING A QUANTITY OF INDIUM TO THE INNER WALL OF A LAMP BULB

Dirk Kolkman, Adolf Jan de Visser, and Cornelis Johannes Adrianus Gerardus Heck, Emmasingel, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 2, 1968, Ser. No. 702,626
Claims priority, application Netherlands, Feb. 11, 1967, 6702109
Int. Cl. C09j *5/00*
U.S. Cl. 156—306 **4 Claims**



A method of attaching a quantity of indium material to the inner walls of a lamp bulb, by urging the material against the wall with a roller and moving the roller clockwise and counter-clockwise alternately.

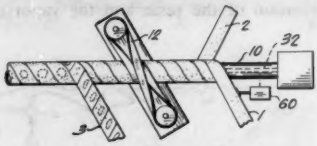
3,574,034

MANUFACTURE OF HELICALLY WOUND CONTAINERS

Denis Michael Harvey and Alistair Kenyon Bodycomb, Baie d'Urfe, Quebec, Canada, assignors to Domtar Limited, Montreal, Quebec, Canada

Filed Apr. 18, 1968, Ser. No. 722,432
Claims priority, application Canada, Apr. 26, 1967, 988,952
Int. Cl. B65h *81/06*
U.S. Cl. 156—432 **4 Claims**

The present invention relates to an apparatus for forming composite tubes and comprising a winding mandrel, a winding mechanism, an extrusion head moveably mounted on the free end of the mandrel and positioned



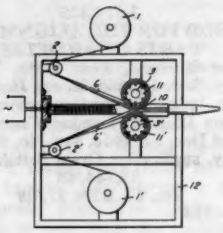
to extrude sealant into the joint of the composite container wound on the mandrel or, if desired, over the total inner surface of the wound container.

3,574,035

DEVICE FOR PRODUCING MULTI-TUBULAR STRUCTURES

Hans Denks, Rheydt, Lutz Horn, Erlangen, and Josef Sucher, Hagen, Germany, assignors to Varta Aktiengesellschaft, Frankfurt am Main, Germany

Filed July 18, 1967, Ser. No. 654,097
Claims priority, application Germany, July 22, 1966, V 31,562
Int. Cl. B32b *31/08*
U.S. Cl. 156—462 **7 Claims**



A multi-tubular structure, for instance the pockets for pocket electrodes, is produced by concurrently moving two webs at equal speed along adacent but spaced paths and causing, during such moving of the two webs, transversely spaced juxtaposed portions thereof to come in contact with each other while preventing contact between the intermediate portions of the two webs. The contacting portions are adhered to each other, so that longitudinally extending, transversely spaced adhering portions of the two webs form therebetween elongated pockets. This is accomplished in a device wherein the two superposed webs are passed between a pair of form rollers which turn about parallel axes, whereby each of the form rollers has a plurality of adjacent peripheral grooves separated by annular rims, and the distance between the axes of the form rollers is such that at the nip of the rollers the annular rims are in close proximity so that the grooves between the rims will define a plurality of substantially closed passages of the desired cross-section of the outer surfaces of the tubular portions of the multi-tubular structure. A plurality of rods is stationarily arranged so as to extend through the passages without contacting the walls of the grooves, and the two webs are passed between the rollers through the passages so that in the zones of the rims the webs will contact each other and will be adhered to each other by compression, heat or in any other suitable

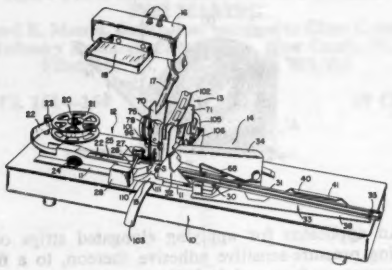
manner, while the rods interposed between adjacent juxtaposed rims will force the web portions against the inner wall of the grooves thereby shaping the tubular pockets.

3,574,036

APPARATUS AND METHOD FOR UPDATING INFORMATION FILES

Edward B. Schoonmaker and Leonard J. Seaberg, Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 2, 1967, Ser. No. 635,414
Int. Cl. G03d *15/04*
U.S. Cl. 156—502 9 Claims



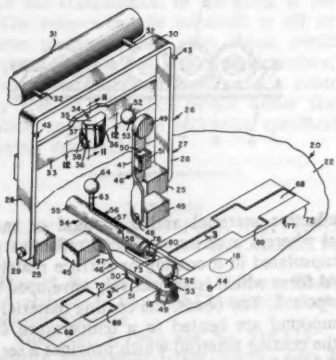
Apparatus and a method of operation are disclosed for updating a file including at least one strip having a portion for receiving an information-bearing chip. The disclosed apparatus operates to move the portion of the strip to a predetermined location, to dispose a web of the information-bearing chips to the predetermined location, to attach the information-bearing chip to the strip, and to sever the attached information-bearing chip from the web.

3,574,037

ULTRASONIC SPLICER

Howard Deans, Secane, and James Wynkoop, Drexel Hill, Pa., and George Goldberg, Jericho, N.Y., assignors to Kleer-Vu Industries, Inc., New York, N.Y.

Filed Feb. 12, 1968, Ser. No. 704,913
Int. Cl. G03d *15/04*
U.S. Cl. 156—502 2 Claims



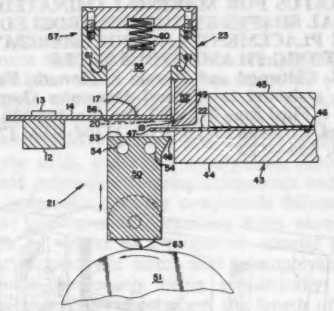
A high-speed splicer for sealing film ultrasonically which has a new cutting and handling concept, a compact console arrangement, a repeating mechanism and a means for providing a high tensile strength of splice.

3,574,038

APPARATUS FOR APPLYING ADHESIVE STRIPS TO CAN BODY BLANKS

Robert W. Wolfe, Oak Lawn, Ill., assignor to Continental Can Company, Inc., New York, N.Y.

Original application July 31, 1967, Ser. No. 657,407, now Patent No. 3,515,614, dated June 2, 1970. Divided and this application Feb. 6, 1970, Ser. No. 9,259
Int. Cl. B32b *31/10, 31/18, 31/20*
U.S. Cl. 156—515 13 Claims



An apparatus for applying a strip of thermoplastic adhesive along a marginal edge portion of body blanks for solderless cans.

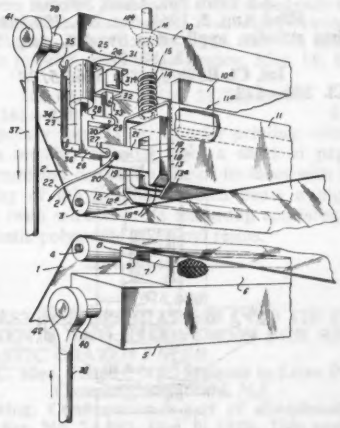
The apparatus includes means for intermittently advancing the blanks toward the strip applying station; means for heating an edge portion of the blanks; strip shearing and applying means at the strip applying station, and means for intermittently advancing the terminal end of strip forming material into the strip shearing and applying means.

3,574,039

FILM SEALING AND CUTTING APPARATUS

Isaac N. Fehr, Sidney E. Cannon, William De Witt Goodman, Dan Sutherland, and Frank Shelby, Dallas, Tex., and Maurice Blais, Providence, R.I., assignors to Campbell Taggart Associated Bakeries, Inc., Dallas, Tex.

Filed Nov. 2, 1967, Ser. No. 680,223
Int. Cl. B32b *31/08, 31/20*
U.S. Cl. 156—515 14 Claims



A device for sealing and cutting plastic film in a machine for packaging substantially uniformly shaped articles such as buns and other bakery products, which includes a base member, a holddown member, a sealing

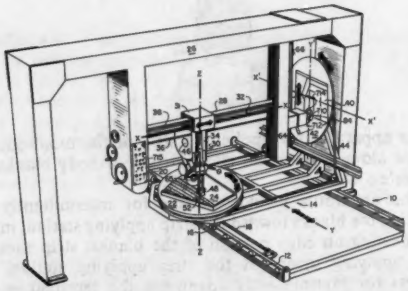
bar and a hot ribbon cutter wherein the holddown member and sealing bar are arranged to come into pressure contact with layers of plastic film pressed thereunder, and the hot ribbon cutter is arranged to reciprocatingly come into contact between the spaced, parallel sealed surfaces of the film to sever same. This abstract should not be construed to limit the disclosure or the scope of the claims hereinafter annexed.

3,574,040

APPARATUS FOR MAKING LAMINATED STRUCTURAL SHAPES BY THE CONTROLLED DETRUSIVE PLACEMENT AND POLYMERIZATION OF TECTONIC FILAMENTOUS TAPES

Billie E. Chitwood and Marvin S. Howeth, Fort Worth, Tex., assignors to General Dynamics Corporation

Filed June 29, 1967, Ser. No. 650,020
Int. Cl. B65h *25/26;* B32b *31/04;* B29c *17/04*
U.S. Cl. 156—522 3 Claims



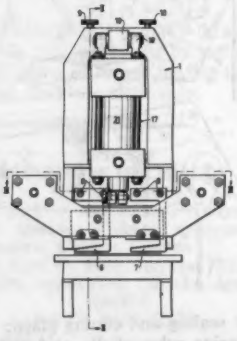
An apparatus characterized by its capability for precision, oriented, unidirectional placement and detrusion of tectonic filamentous tapes to form structural shapes. It is capable of operating in from a 3-axis to 5-axis coordinate trace and comprises, in combination, a function control system, a base member, a tape placement and detrusion pendant and a work supporting bed, at least one of the latter movable with respect to the other.

3,574,041

STRIP CUTTING AND AFFIXING APPARATUS

Hans-Georg Wilhelm Melle, Lund, Sweden, assignor to AB Tetra Pak, Lund, Sweden

Filed Aug. 5, 1968, Ser. No. 750,263
Claims priority, application Sweden, Aug. 7, 1967, 11,188/67
Int. Cl. B32b *31/18;* B26d *5/08*
U.S. Cl. 156—522 1 Claim



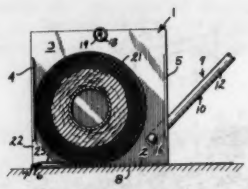
Apparatus to sever and heat seal a strip of material to a web of material using a fixed cutter blade and movable cutter blade with the movable cutter blade being capable of movement away from and toward the fixed cutter blade without readjustment of the relative positions of the blades.

3,574,042

TAPE APPLICATOR

Thomas J. McMullen and Thomas James McMullen, Jr., Minneapolis, Minn., assignors to The McMullen Co., St. Paul, Minn.

Filed May 5, 1969, Ser. No. 821,718
Int. Cl. B32b *31/20;* B44c *7/02*
U.S. Cl. 156—577 5 Claims



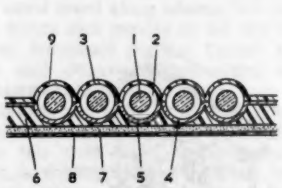
An applicator for applying elongated strips of tape, having pressure-sensitive adhesive thereon, to a floor or pavement surface and including a receptacle for a roll of tape, the receptacle having a bottom wall movable over said surface for applying pressure to the tape thereagainst during dispensing of the tape to said surface. A handle is connected to the receptacle for imparting applying movement thereto.

3,574,043

REFLECTIVE MATERIAL AND METHOD OF MAKING SAME

Leonard Joshua Luber, Woollahra, New South Wales, and Alfred Thomas Clutton, Harbord, New South Wales, Australia, assignors to Industrial Science Research Pty. Limited, Sydney, New South Wales, Australia

Filed Dec. 11, 1967, Ser. No. 689,439
Claims priority, application Australia, Dec. 13, 1966, 15,188/66
Int. Cl. B29d *27/04;* B32d *27/04*
U.S. Cl. 161—5 17 Claims



A reflective material and a method of making such material wherein a series of spaced reflective glass beads are encapsulated in a coating or surface material in solid or liquid form which is protectively enveloped by a carrying compound. The beads, the coating material and carrying compound are heated to a temperature sufficient to gasify the coating material which provides a series of coating gas bubbles retained within the carrying compound and each bubble encapsulates an individual bead which in effect is running freely in a gas bubble. The aforementioned components are then incorporated into a base carrier such as paint or ink or laminated to a base carrier in sheet form.

3,574,044
PRINTED FILM OF POLYBUTENE-1
Thomas Hugh Shepherd, Hopewell, N.J., assignor to Princeton Chemical Research, Inc., Princeton, N.J.
No Drawing. Filed Feb. 11, 1965, Ser. No. 432,004
Int. Cl. B29d 7/24; B44f 5/00
U.S. Cl. 161—6 4 Claims

Method of making printed polybutene-1 by forming a film of such polymer; stretching the film an amount sufficient to cause the film to become opaque; and treating selected portions of thus stretched film with heat and/or pressure under conditions sufficient to render such portions substantially transparent.

3,574,045
SKIN-TEMPERED GLASS AND PROCESS FOR MAKING
Richard E. Mould, Butler, Pa., assignor to Glass Container Industry Research Corporation, New Castle, Pa.
Filed Apr. 23, 1968, Ser. No. 723,395
Int. Cl. C03b 27/00
U.S. Cl. 161—164 19 Claims

A superfield temper is imparted to a surface or surface portion of a glass object by heating to a temperature within the viscoelastic range of the glass sufficiently to render the glass at said surface portion less viscous than the remainder of the glass at the interior of the object, and then quenching the heated surface portion to create a temperature gradient therein. The rates of heating and of quenching are desirably sufficiently high to avoid significantly raising the temperature of the rest of the cross-section of the glass at the surface portion. The temper can be imparted to all or part of one or more surfaces of the glass object, resulting in a thin compression layer on the treated surface, an adjacent compensating tension layer, and a neutral layer practically free of significant stress. Other features of the invention appear in the following specification and accompanying drawing.

3,574,046
BIAXIALLY ORIENTED POLYETHYLENE-1:2-DIPHENOXYETHANE-4:4'-DICARBOXYLATE SHEETS
Richard Harold Barclay Buteux, Welwyn Garden City, England, assignor to Imperial Chemical Industries Limited, London, England
Filed Apr. 3, 1968, Ser. No. 718,615
Claims priority, application Great Britain, Apr. 20, 1967, 18,284/67; Nov. 24, 1967, 53,637/67
Int. Cl. B29d 7/24; B32b 27/36
U.S. Cl. 161—165 3 Claims

Balanced biaxially oriented and preferably heat-set films of polyethylene - 1:2-diphenoxyethane-4:4'-dicarboxylate of 5 to 750 gauge in thickness.

3,574,047
COMPOSITE FILAMENT HAVING REDUCED STICKINESS
Satoshi Ando and Yusaku Tanaka, Osaka, Minoru Kojima, Osaka-fu, and Kyoichi Fujimura, Ibaraki, Japan, assignors to Kanegafuchi Boseki Kabushiki Kaisha, Tokyo, Japan, and Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A., Milan, Italy
Original application Dec. 14, 1966, Ser. No. 601,757, now Patent No. 3,554,980, dated Jan. 12, 1971. Divided and this application Sept. 3, 1968, Ser. No. 798,208
Claims priority, application Japan, Dec. 23, 1965, 40/79,726
Int. Cl. D01d 5/28; D02g 1/00
U.S. Cl. 161—173 1 Claim

Composite filaments having latent crimpability and reduced stickiness which consists essentially of (1) a homopolyamide derived from polyamide forming compounds selected from the group consisting of lactams, omega-aminocarboxylic acids and salts of diamines and dicarboxylic acids, and (2) a copolyamide derived from one of said polyamide forming compounds and at least one said polyamide forming compounds different therefrom, said copolyamide containing from about 0.3 to about 3% by weight of a mono- or dimetal salt of a mono- or dicarboxylic acids, said homopolyamide and copolyamide components being eccentrically disposed relative to each other throughout the length of the filament.

3,574,048
ADHESIVE FOR SYSTEM COPPER-POLYETHYLENE TEREPHTHALATE LAMINATES
Kenneth W. Klimisch, Northfield, Minn., assignor to G. T. Schjeldahl Company, Northfield, Minn.
No Drawing. Filed June 7, 1967, Ser. No. 644,057
Int. Cl. B32b 15/08, 15/20; C09j 3/16
U.S. Cl. 161—190 4 Claims

A laminate system including copper and polyethylene terephthalate, preferably bi-axially oriented polyethylene terephthalate, the members forming the laminate being bonded together by a film of an adhesive which consists essentially of a polyester resin modified with polymethylene polyphenylisocyanate. The preferred polyester resin composition is prepared from a linear saturated copolymer composition consisting of the ethyl esters of sebacic and terephthalic acids.

3,574,049
TRANSFER PRINTING
Pierre Sander, Tourcoing, France, assignor to Trentesaux-Toulemonde, Tourcoing, France
No Drawing. Filed Mar. 14, 1967, Ser. No. 623,045
Claims priority, application France, Mar. 16, 1966, 53,596
Int. Cl. B32b 15/20, 23/22, 29/00
U.S. Cl. 161—220 6 Claims

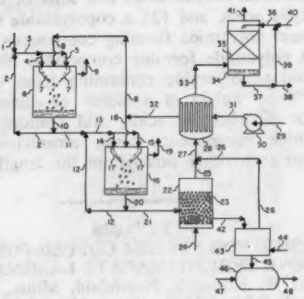
A temporary support for transfer printing, which consists of a member selected from a sheet of paper and an aluminum foil coated on one of its faces with a transfer coating of ethylcellulose which bears a pigmented film of a resin selected from the group consisting of the thermoplastic polyamide and vinyl resins.

3,574,050
PROCESS FOR SEPARATING INTO ITS COMPONENTS AND RECOVERING FOR REUSE PLASTIC COATED PAPER
John C. Rice, Tenafly, N.J., assignor to Lowe Paper Company, Ridgefield, N.J.
No Drawing. Continuation-in-part of abandoned application Ser. No. 74,983, Dec. 9, 1960. This application Aug. 21, 1962, Ser. No. 218,463
Int. Cl. D21b 1/08, 1/32; D21c 5/02
U.S. Cl. 162—5 7 Claims

Paper Stock material coated with synthetic plastics is separated into its components for reuse. The coated paper

is shredded into about one-half to two inch strips. The strips are pulped into water at a temperature of about 160° F. where the defibering is accomplished without disintegration of the plastic waste. The pulped material is then screened whereby the plastic waste is separated from the cellulosic material.

3,574,051
RECOVERY OF BLACK LIQUOR
Indravadan S. Shah, Forest Hills, N.Y., assignor to Chemical Construction Corporation, New York, N.Y.
Filed Feb. 8, 1968, Ser. No. 704,054
Int. Cl. D21c *11/10, 11/12*
U.S. Cl. 162—30 **3 Claims**



Weak black liquor derived from wood pulp processing as a result of pulp washing, is concentrated, and solid salts are produced for the preparation of green liquor which is recycled to the wood pulp process. The weak black liquor is concentrated by direct contact with hot air, and the concentrated liquor is reacted with process air at elevated temperature in a fluidized bed type of reactor, to produce solid sodium sulfate and sodium carbonate salts for recycle and a hot flue gas. The hot flue gas is passed in indirect heat exchange with ambient or initially warm air, to produce the hot air for black liquor concentration. The solid salts, consisting mostly of sodium sulfate and sodium carbonate, are reacted at elevated temperature with a reducing type gas in a chemical reactor, to produce a sodium sulfide-carbonate mixture which is dissolved in an aqueous liquid, such as water or dilute wash liquor, to produce green liquor. The hot gas stream discharged from the salts reduction step is preferably combined with the hot flue gas generated during solid salts production from concentrated black liquor, and the combined gas stream is then employed to preheat air. The process is preferably applicable to a kraft pulp process.

3,574,052
CHEMICAL PULPING AND BLEACHING IN AN ENCLOSED REACTION ZONE, BY REDUCTION OF CHLORATE
Gothe Oscar Westerlund and Kin Seto, Vancouver, British Columbia, Canada, assignors to Chemech Engineering Ltd., Vancouver, British Columbia, Canada
No Drawing. Filed July 7, 1967, Ser. No. 651,712
Claims priority, application Canada, Feb. 28, 1967, 983,967
Int. Cl. D21c *3/06*
U.S. Cl. 162—64 **22 Claims**

A process for the treatment of cellulosic material in subdivided form including the steps of firstly providing an enclosed reaction zone for the treatment of the cellulosic materials; secondly providing a reactant liquor phase in the reaction zone; thirdly providing a superposed gas phase over the reactant liquor in the reaction zone; and fourthly agitating the cellulosic material in the enclosed reaction zone. The improvement involves using as the reactant liquor phase, an aqueous liquor comprising a liquor soluble chlorate and a reducing agent for the chlorate, the reducing agent being present in 0.1 to 2.0 molar excess based upon the amount of chlorate used. Because of the series of steps carried out and the particular composition of the reactant phase, the gas phase superposed over the reactant liquor in the enclosed reaction zone contains evolved chlorine dioxide and/or chlorine thus preventing any encrustation which may form on the outer walls or surfaces of the cellulosic materials.

3,574,053
ALKYL ACRYLATE-POLYALKYLENEIMINE SIZING COMPOSITION AND METHOD OF SIZING PAPER THEREWITH
William R. Hine, Jr., Kirkwood, and Myron J. Holm, St. Louis, Mo., assignors to Monsanto Company, St. Louis, Mo.
No Drawing. Continuation-in-part of application Ser. No. 500,209, Oct. 21, 1965. This application June 30, 1969, Ser. No. 837,959
The portion of the term of the patent subsequent to Aug. 12, 1986, has been disclaimed and dedicated to the Public
Int. Cl. D21d *3/00*; D21h *3/40*
U.S. Cl. 162—168 **16 Claims**

A composition of an alkyl acrylate having 22 to 30 carbon atoms in the alkyl group such as docosyl or octacosyl acrylate and a polyalkyleneimine or poly (N-methylalkyleneimine) or mixtures thereof having 2 to 3 carbon atoms in each alkylene bridge such as polyethyleneimine or poly (N-methylpropyleneimine). The composition is dispersed within the wet pulp as a size in the formation of a paper web.

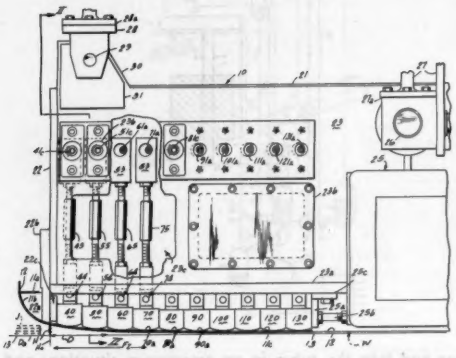
3,574,054
METHOD AND APPARATUS FOR USING WIRE STRANDS AS FOURDRINIER WIRE DRAINAGE ELEMENTS
Ruel E. Taylor, Jr., West Buxton, Maine, assignor to Scott Paper Company, Delaware County, Pa.
Filed Aug. 6, 1968, Ser. No. 750,553
Int. Cl. D21f *1/54*; D21g *9/00*
U.S. Cl. 162—211 **10 Claims**

In a Fourdrinier papermaking machine, paper stock consisting of approximately 99 percent water is flowed onto an endless moving wire mesh. As this water seeps through the wire mesh and forms an irregularly shaped film on its underside, the surface tension of the film is broken and the water drained by a series of tensioned wire strands disposed below the mesh and transversely to mesh flow. The wire strands are secured at each end to the machine frames by adjustable wire brackets, which provide vertical adjustment to regulate the distance between the wire mesh and the wire strands and parallel adjustment to align the wire strands parallel to the wire mesh. Means are also provided for tensioning the wire strands.

3,574,055
ADJUSTABLE GUIDE FOR THE FORMING ZONE OF A PAPER MACHINE
David R. Gustafson, Rockton, Ill., assignor to Beloit Corporation, Beloit, Wis.
Filed Nov. 15, 1967, Ser. No. 683,225
Int. Cl. D21f *1/36*
U.S. Cl. 162—303 **9 Claims**

A paper web is formed between between a pair of converging forming wire runs. A plurality of bars, each of

which extends transversely across the wire runs, forms a contoured longitudinally extending guide surface. A thin guiding sheet, which conforms to the contoured guide surface, guides one of the wire runs along the contoured guide surface and into gradual convergence with the other wire run. Each of the plurality of bars is mounted for



independent and separate adjustment to selectively alter the contour of the guide surface.

3,574,056

STRIPPING FOIL ASSEMBLY FOR PAPER MACHINES

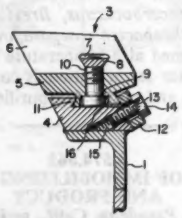
Hans Jud, Esslingen, and Manfred Nussbaum, Ploshingen, Germany, assignors to Feldmuhle Aktiengesellschaft, Dusseldorf, Germany

Filed Mar. 20, 1968, Ser. No. 714,747

Claims priority, application Germany, Mar. 22, 1967, F 51,909

Int. Cl. D21g 9/00

U.S. Cl. 162—352 7 Claims



Carrier steel bars extending across the width of the Fourdrinier wire in a paper machine carry metallic or plastic supports elongated in the direction of wire width and releasably attached to the carrier bars in end-to-end relationship. Foil sections of sintered alumina are juxtaposed on each support, thereby permitting adjustment and removal of the foil sections without disturbing their relationship with a contiguously adjacent metallic support.

3,574,057

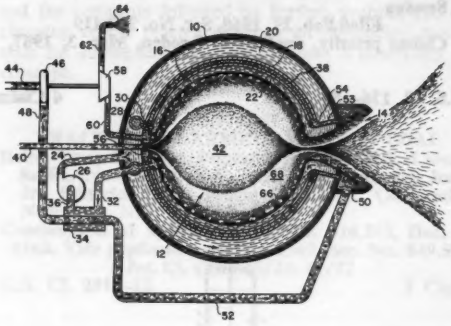
GAS CORE NUCLEAR REACTOR

Frank E. Rom, Avon Lake, Ohio, assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration

Filed May 27, 1968, Ser. No. 732,455

Int. Cl. G21c 3/56, 19/28

U.S. Cl. 176—45 11 Claims



A gas passes through a pervious liner into a gaseous core nuclear reactor. This gas cools the liner and is then heated by a fissionable gas in the core. The heated gas is discharged from the reactor.

3,574,058

NUCLEAR FUEL ASSEMBLY

André Gumuchian, Paris, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Nov. 27, 1967, Ser. No. 685,862

Claims priority, application France, Dec. 5, 1966, 86,219

Int. Cl. G21c 3/32

U.S. Cl. 176—78 7 Claims

A nuclear fuel assembly comprising at least one bundle of pins provided with expansion chambers and disposed

within a tubular box which constitutes a coolant circulation system.

The box comprises a central tubular support structure having a bottom end-fitting and a top end-fitting or lifting head. The tubular structure serves to support the pins and constitutes an axial duct which by-passes the space located between the expansion chambers.

3,574,059
CONTROL ROD ARRANGEMENT FOR LIGHT WATER NUCLEAR REACTORS

Bengt Martin Södergård, Vasteras, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Feb. 29, 1968, Ser. No. 709,419
Claims priority, application Sweden, Mar. 3, 1967, 3,002/67
Int. Cl. G21c 7/10
U.S. Cl. 176—86 **4 Claims**

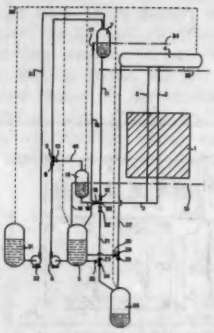
In a light water reactor, a control rod is of cruciform cross-section and runs in a cruciform gap between fuel assemblies arranged in a square, and in a guide tube arranged below the fuel assembly. The guide tube has a somewhat greater diameter than the span of the control rod across the cruciform section. The control rod is joined to an operating device arranged under the guide tube. At the lower end of the control rods the points of the control rod cross are provided with guide plates rounded off at the points facing the guide tube. The guide plates may consist of graphite or be coated on the surface facing the guide tube with a hard material such as stellite. The rounding off of the guide plates has a slightly smaller radius of curvature than the guide tube.

3,574,060
LIQUID SAFETY ROD SYSTEM FOR NUCLEAR REACTORS

Sergio Galli de Paratesi, Varese, and Alberto Agazzi, Bergamo, Italy, Armando Broggi, Santa Fe, Argentina, and Luciano Ghiurghi, Varese, Italy, assignors to European Atomic Energy Community (Euratom), Brussels, Belgium

Filed Oct. 18, 1968, Ser. No. 768,637
Claims priority, application Belgium, Oct. 26, 1967, 50,094
Int. Cl. G21c 7/22
U.S. Cl. 176—86 **7 Claims**

A liquid safety rod system for a nuclear reactor comprising a plurality of tubes extending through a reactor core and connected to a lower collector, upper and lower poison solution reservoirs, conduit means including a pump connecting the upper and lower reservoirs for transferring poison solution from the lower to the upper reservoir, a valve controlled conduit connecting the upper reservoir and the lower collector to permit the flow of poison solution from the upper reservoir through the collector and into the tubes in an emergency situation; and further including a washing circuit comprising essentially a washing-liquid reservoir, a pump and a washing-residue reservoir operatively connected to permit the safety-rod tubes to be cleansed of poison solution.



3,574,061
PROCESS FOR PREPARING L-ORNITHINE BY FERMENTATION

Katsunobu Tanaka, Kazuo Ohshima, and Yoh Tokoro, Tokyo, Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Tokyo-to, Japan

No Drawing. Filed Oct. 3, 1967, Ser. No. 672,434
Claims priority, application Japan, Oct. 6, 1966, 41/65,426
Int. Cl. C21b 1/00
U.S. Cl. 195—28 **15 Claims**

The present invention is directed to a process for the preparation of L-ornithine. The compound is prepared by culturing an organism capable of producing L-ornithine in a medium where a hydrocarbon, and in particular a paraffin, is used as the main carbon source. The medium, in addition, contains a nitrogen source and the microorganism is one which is derived from a nutrient requiring strain and preferably one which is either an arginine or a citrulline requiring mutant strain. These strains are generally obtained from *Arthrobacter paraffineus, Corynebacterium hydrocarboclastus, Brevibacterium ketoglutamicum* and *Arthrobacter roseparaffinus*. The culture is preferably performed at a temperature of 25 to 40° C. at a neutral pH. After fermentation is complete the L-ornithine is separated and preferably purified.

3,574,062
METHOD OF IMMOBILIZING ENZYMES AND PRODUCT

Takuya R. Sato, Pasadena, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

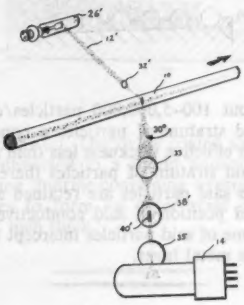
No Drawing. Filed Apr. 20, 1967, Ser. No. 632,169
Int. Cl. C07g 7/02; C08h 1/00, 7/00
U.S. Cl. 195—63 **6 Claims**

A method of immobilizing enzymes by reacting an enzyme with a diazo-protein substrate such as diazo-protein polyurethane. The substrate may be prepared by diazotizing a polyester polyurethane and coupling a protein to the diazotized polyurethane. The immobilized enzyme may be used as a catalyst in analytical procedures and the substrate is preferably a reticulated structure.

3,574,063
METHOD FOR BACTERIA COUNTING AND ANTIBIOTIC SENSITIVITY ASSAY

Robert L. Bowman, Bethesda, Md., assignor to the United States of America as represented by the Secretary of Health, Education, and Welfare

Filed June 26, 1967, Ser. No. 648,735
Int. Cl. C12k *1/00*
U.S. Cl. 195—103.5 6 Claims

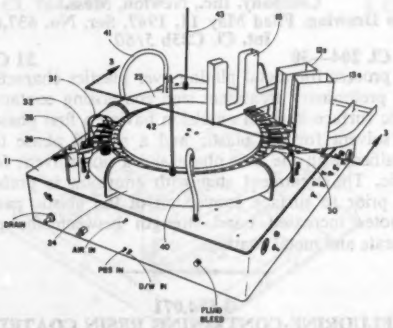


The disclosure relates to a method for counting bacterial colonies quickly and simply and for assaying the antibiotic sensitivity of such bacteria. Organisms are cultured in an extremely narrow channel and counting of the colonies is based on the scattering from a light beam focused into the narrow channel.

3,574,064
AUTOMATED BIOLOGICAL REACTION INSTRUMENT

Gerald F. Binnings, Arcadia, Theodore N. Meyer, Westminster, and Mel J. Riley, Covina, Calif., assignors to Aerojet-General Corporation, El Monte, Calif.

Filed May 9, 1968, Ser. No. 727,859
Int. Cl. C12k *1/10*
U.S. Cl. 195—127 7 Claims

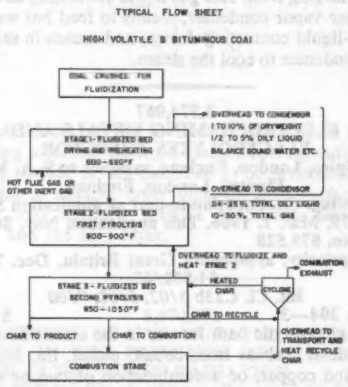


This disclosure describes apparatus for automatically processing special laboratory slides carrying specific antigenic material with samples of blood serum taken from patients to detect the presence of specific antibodies in the serum as an indication of previous exposure to the antigen. Specifically, the disclosure describes the apparatus as applied to the fluorescent treponemal antibody (FTA) test for syphilis using an indirect fluorescent antibody technique with *T. pallidum* (nichols strain) as the antigen. The apparatus of the invention includes a mechanism for discharging from a magazine a number of antigen carrying laboratory slides onto a rotating carrier and the dispensing of samples of patients serum onto the laboratory slides. This is followed by the incubation of the slide carrying the previously fixed antigen and the patients serum for several minutes to allow the reaction of any specific antibodies in the serum with the fixed antigen. The apparatus further includes means for washing to remove excess serum, means for injecting a conjugate which reacts with the human serum affixed to the antigen and carries a fluorescent tag such as fluorescein isothiocyanate. The apparatus includes means for further incubation to insure the reaction between the antigen-antibody complex and the conjugate followed by further washing and discharging of the reacted slides to an off-loading mechanism for subsequent examination under a laboratory microscope.

3,574,065
FRACTIONAL CARBONIZATION OF COAL

Ralph Tracy Eddinger, Princeton Junction, N.J., Leonard Seglin, New York, N.Y., and John Frederick Jones, Jr., Princeton, N.J., assignors to FMC Corporation, New York, N.Y.

Continuation of application Ser. No. 514,203, Dec. 16, 1965. This application Aug. 5, 1969, Ser. No. 849,591
Int. Cl. C10b *49/10, 49/22*
U.S. Cl. 201—12 3 Claims


TYPICAL FLOW SHEET
HIGH VOLATILE B BITUMINOUS COAL
COAL CRUSHED FOR FLUIDIZATION
OVERHEAD TO CONDENSER
1 TO 10% OF DRYWEIGHT
1/2 TO 5% OILY LIQUID
BALANCE BOUND WATER ETC.
STAGE 1 - FLUIDIZED BED DRYING AND PREHEATING
600 - 850°F
HOT FLUE GAS OR OTHER INERT GAS
OVERHEAD TO CONDENSOR
STAGE 2 - FLUIDIZED BED FIRST PYROLYSIS
800 - 900°F
OVERHEAD TO FLUIDIZE AND HEAT STAGE 2
COMBUSTION EXHAUST
STAGE 3 - FLUIDIZED BED SECOND PYROLYSIS
950 - 1050°F
HEATED CHAR
CYCLONE
CHAR TO RECYCLE
CHAR TO PRODUCT
CHAR TO COMBUSTION
OVERHEAD TO TRANSPORT AND HEAT RECYCLE CHAR
COMBUSTION STAGE

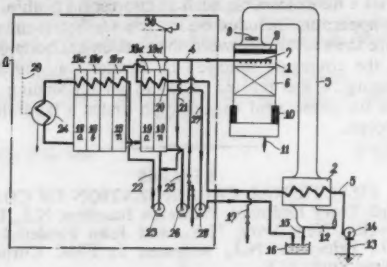
A process of pyrolyzing coal, by heating it in a first stage fluidized bed in the absence of added oxygen and vapors from coal pyrolysis containing material condensable as oily liquid, at a temperature below the fusion temperature, but sufficiently high to remove some volatiles from the dry coal until about 1–10% of the dry coal are removed overhead as volatiles; in at least a second devolatilizing stage, passing the thus treated coal into at least one other fluidized bed at a temperature above that of the first bed and below the fusion point of the solids fed to that stage, in the absence of oxygen for a time sufficient to nearly remove all of the volatiles from the coal condensable to oily liquids; dividing the nearly devolatilized char into a product stream, a recycle stream and a combustion stream; completely burning the combustion stream, entraining the recycle stream in the hot gases from the combustion stream, separating the entrained recycle char from the hot gases, and recirculating the heated recycle stream into the final devolatilizing stage, and recovering the condensables from the overheads from the first stage and all of the devolatilizing stages.

3,574,066

MULTISTAGE EVAPORATION UNIT AND GAS-LIQUID DIRECT CONTACT DISTILLATION APPARATUS

Jiro Kijima and Toshio Bekki, Yokohama, Japan, assignors to Kurita Industrial Company, Limited, Osaka, Japan

Filed Nov. 4, 1968, Ser. No. 773,210
Claims priority, application Japan, Feb. 19, 1968, 43/10,223
Int. Cl. B01d *3/06*
U.S. Cl. 202—173 **1 Claim**



A water purification apparatus comprising a gas-liquid contacting device for bringing hot water into contact with a gas to evaporate a part of said water, a water vapor condenser, means to introduce the water vapor-containing gas discharging from said gas-liquid contacting device into said water vapor condenser, means to feed hot water into said gas-liquid contacting device, and means in said water vapor condenser to cool the steam.

3,574,067

ELECTROFORMING METALS AND ELECTROLYTES THEREFOR

Peter Spiro, London, England, assignor to S. A. Vickers Limited, London, England

No Drawing. Continuation-in-part of application Ser. No. 530,779, Mar. 1, 1966. This application Nov. 24, 1969, Ser. No. 879,528
Claims priority, application Great Britain, Dec. 7, 1965, 51,851/65
Int. Cl. C23b *5/02, 5/08, 7/00*
U.S. Cl. 204—3 **5 Claims**

In an electrolytic bath for use in the electro-forming of a base metal such as iron, cobalt, nickel, tin, zinc, manganese and copper, or a combination of two or more of these, the improvement which comprises that the bath contains at least one acetylenic compound devoid of amino groups in an amount within the range of 0.1 to 10 g./l., at least one α,β-unsaturated aromatic compound selected from the group consisting of cinnamic acid, cinnamaldehyde, 1,2-benzopyrone and phthalylacrylic acid, in an amount within the range of 0.1 to 50 g./l. and at least one difunctional aromatic acid containing in the molecule at least one carboxylic acid group and at least one sulphonic acid group and selected from the group consisting of sulphophthalic acid, sulphoisophthalic acid and sulphosalicylic acid, the difunctional aromatic acid being present in the bath in an amount within the range of 0.1 to 100 g./l.

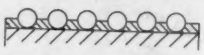
3,574,068

PROCESS FOR PREPARING A METAL PLATE RECEPTIVE TO A DECORATIVE METAL DEPOSIT

Hyman Chessin, Birmingham, Mich., assignor to M & T Chemicals Inc., New York, N.Y.

Filed Nov. 23, 1965, Ser. No. 509,267
Int. Cl. C23b *5/01, 7/00*; C23f *17/00*
U.S. Cl. 204—16 **20 Claims**

In accordance with certain of its aspects, this invention relates to novel compositions and to the process for preparing a metal plate receptive to a decorative noble metal deposit, characterized by the presence of microporous areas and microcracked areas over substantially the entire surface of said noble metal plate, which comprises affixing to a basis material bearing a conductive metal surface a stratum of particles having a particle size of about 0.05–15 microns and a density on said conductive metal



surface of about 100–5,000,000 particles/cm.^{2}, and depositing in said stratum of particles a conductive metal layer having an effective thickness less than the maximum thickness of said stratum of particles thereby forming a matrix wherein said particles are retained affixed to said surface in fixed position in said conductive metal layer, and at least some of said particles intercept the surface of said conductive metal layer.

3,574,069

METHOD OF FORMING A PROTECTIVE COATING ON A FERROUS SURFACE

Carlton E. Roberts, Bethlehem, and George W. Ward, Nazareth, Pa., assignors to Bethlehem Steel Corporation

Filed Aug. 18, 1967, Ser. No. 661,617
Int. Cl. C23b *5/50*
U.S. Cl. 204—29 **9 Claims**

In a process of forming a protective coating on ferrous articles, such as steel strip, the article is treated in an aqueous electroplating bath of chromic acid, a silicofluoride and sulfate. The strip, acting as cathode, is subjected to the electrolytic action of the bath at a relatively high current density for a period sufficient to deposit a thin film of chromium thereon. The strip is then given a similar treatment in a less concentrated bath of the same chemical composition as that of the first bath.

3,574,070

METAL PLATING OVER PLASTIC

Camille Sahely, Wellesley Hills, Mass., assignor to Shipley Company, Inc., Newton, Mass.

No Drawing. Filed May 11, 1967, Ser. No. 637,644
Int. Cl. C23b *5/60*
U.S. Cl. 204—30 **31 Claims**

A process for metal plating over plastics characterized by a preliminary treatment step comprising contact of a plastic surface with an emulsion having a first phase that is a solvent for the plastic and a second phase that is emulsified with the first phase and a non-solvent for the plastic. The treatment step with emulsion is preferably used prior to surface conversion of the plastic part and promotes increased bond strength between the plastic substrate and metal coating.

3,574,071

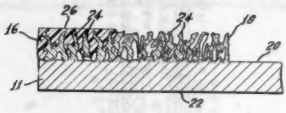
FLUORINE-CONTAINING RESIN COATED ARTICLES

Charles P. Covino, Upper Montclair, N.J., assignor to General Magnaplate Corporation, Linden, N.J.

Continuation-in-part of applications Ser. No. 384,615, July 23, 1964, and Ser. No. 554,353, June 1, 1966. This application Mar. 29, 1968, Ser. No. 717,278
Int. Cl. C23b *9/02*
U.S. Cl. 204—38 **16 Claims**

A process for preparing a composite aluminum article having an inner layer of aluminum, an intermediate integral layer of aluminum oxide, and an outer layer of a fluorine-containing resinous material comprising anodicly

oxidizing a clean aluminum metal in an aqueous bath at a temperature between 25° F. and 80° F., said bath containing between 4% and 7.34% of sulfuric acid and between 0.5 and 3% of a carboxylic acid, while passing air through said aqueous bath to form an oxide coating on

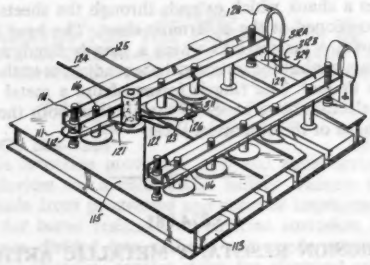


the aluminum metal. The oxide coated aluminum is then rinsed and immersed in a liquid aqueous impregnation bath containing fluorine-containing hydrocarbon polymer resin particles to form an outer resin coating at least about 0.0001 inch thick.

3,574,072
POLYMERIZATION OF HETEROCYCLIC COMPOUNDS
James J. Louvar, Evanston, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.
No Drawing. Filed Apr. 3, 1968, Ser. No. 718,334
Int. Cl. C07b *29/06*; B01k *1/00*
U.S. Cl. 204—72 **7 Claims**

Heterocyclic compounds containing both 5- and 6-membered rings such as furan, thiophene, pyrrole, pyran, thiopyran, and pyridine are polymerized by subjecting the compounds to electrolysis in the presence of an organic solvent, a specific example being the electrolysis of furan in acetic acid to form polyfuran.

3,574,073
METHOD FOR ADJUSTING ELECTRODES
Richard W. Ralston, Jr., Cleveland, Tenn., assignor to Olin Corporation
Filed Sept. 4, 1968, Ser. No. 757,437
Int. Cl. C01d *1/14*; B01k *3/00*
U.S. Cl. 204—99 **8 Claims**

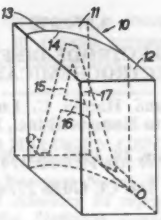


Anodes are adjusted in a mercury cathode electrolytic cell using hydraulic means for raising and lowering the anodes where the hydraulic means is actuated (1) by using the changes in flux of the magnetic field generated by the electrical flow in the conductors supplying the anodes to prevent or correct short circuits and (2) electrically controlling the operation of the hydraulic system.

3,574,074
SURFACE TREATED PLATINIZED ANODES
Rajendra Paul Khera, Woodbridge, Conn., assignor to Olin Corporation
No Drawing. Filed July 23, 1968, Ser. No. 746,770
Int. Cl. C01b *7/06*; C23f; B01k *3/06*
U.S. Cl. 204—128 **4 Claims**

Power costs in the electrolytic production of chlorine using platinum metal surfaced anodes are reduced by first subjecting the anodes as electrodes to the action of alternating current in an electrolytic solution.

3,574,075
METHOD OF PRODUCING AN ELECTRODE FOR USE IN ELECTRO MACHINING
George O. Eccles, Thornton-in-Craven, Skipton, England, assignor to Rolls-Royce Limited, Derby, England
Filed Mar. 21, 1969, Ser. No. 809,257
Int. Cl. B23p *1/00*; C23b *7/02*
U.S. Cl. 204—143 **8 Claims**



An electrode for use in electromachining is made by producing a former having a surface corresponding to the working surface of the electrode to be produced, electrodepositing a metallic layer onto the said surface of the former, and effecting relative separation between the former and the said layer.

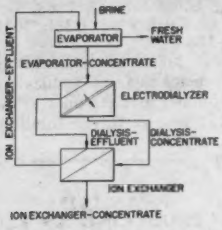
3,574,076
CONVERSION OF UNSATURATED HYDROCARBONS IN THE PRESENCE OF A CATALYST AND ULTRAVIOLET RADIATION
Francis William Kirsch, Wayne, Pa., assignor to Sun Oil Company, Philadelphia, Pa.
No Drawing. Filed Oct. 27, 1967, Ser. No. 678,544
Int. Cl. B01j *1/10*
U.S. Cl. 204—162 **9 Claims**

A method of increasing the conversion of reactants when reacting hydrocarbons such as aromatics, alkenes, aryl alkenes, etc., which absorb ultraviolet radiation; said method consists of subjecting the reactants to the influence of a Group VIII metal supported on a refractory inorganic oxide carrier and ultraviolet radiation.

3,574,077
EVAPORATION-ELECTRODIALYSIS PROCESS FOR PRODUCING FRESH WATER FROM BRINE
Yoshio Tsunoda, Tokyo, and Leo Ehara and Hideo Kawate, Onahama, Japan, assignors to Asahi Kasei Kabushiki Kaisha, Osaka, Japan
Filed Aug. 13, 1969, Ser. No. 849,668
Claims priority, application Japan, Aug. 17, 1968, 43/58,240, 43/58,241; Nov. 30, 1968, 43/87,392, 43/87,393
Int. Cl. B01d *13/02*
U.S. Cl. 204—180 **11 Claims**

A process for producing fresh water efficiently by passing the brine through a system consisting of an evapo-

rator and an electrodialyzer using ion exchange membranes (hereinafter referred to as an electrodialyzer)



and, if required, an ion exchanger while preventing the formation of scale in the evaporator.

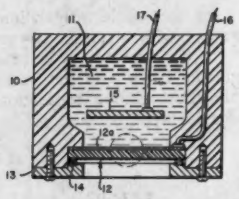
3,574,078

COMPOSITE ELECTRODE-DIFFUSION MEDIUM FOR ELECTROCHEMICAL SENSORS

John P. Hynes and Harold C. Lofgren, Minneapolis, Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 18, 1968, Ser. No. 776,360

Int. Cl. G01n 27/46
U.S. Cl. 204—195 **5 Claims**



A composite electrode-diffusion medium, for use with electrochemical cells particularly of the polarographic type such as those used for oxygen sensing, consisting of a laminated permeable diffusion medium having an electrode body carried by one of the laminations.

3,574,079

APPARATUS FOR OXYGEN DETERMINATION

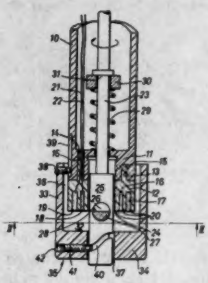
Laslo Kalman, Zurich, Switzerland, assignor to Gesellschaft zur Forderung der Forschung an der Eidg. Techn. Hochschule, Zurich, Switzerland

Filed Mar. 14, 1969, Ser. No. 807,350

Claims priority, application Switzerland, Mar. 14, 1968, 3,795/68

Int. Cl. G01n 27/46
U.S. Cl. 204—195 **12 Claims**

In an electrochemical apparatus for determining oxygen concentration in a liquid, said apparatus including an anode and a cathode, the electrodes are tubular sections having annular profiles and their surfaces are covered by electrically insulating layers excepting for one frontal area on each electrode. The electrodes are provided with rotatable abrading means, fitting snugly against the uncovered



areas of the electrodes and against surfaces adjacent said areas, for cleaning said areas and adjacent surfaces.

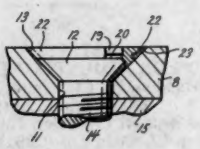
3,574,080

CORROSION INHIBITING FASTENER MEANS

Joseph E. Jones, St. Louis, and David S. Macy, Creve Coeur, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Nov. 18, 1966, Ser. No. 595,516

Int. Cl. C23f 13/00
U.S. Cl. 204—197 **6 Claims**



A fastener for securing two sheets of metal together includes a shank which extends through the sheets and a head positioned at the outermost sheet. The head is provided with a recesss into which a ring is fitted, and the ring bears against the outermost sheet adjacent to the outer surface thereof. The ring is formed from a metal higher in the electromotive series of metals than both the metal of the head or the outermost sheet.

3,574,081

CORROSION RESISTANT METALLIC ARTICLES

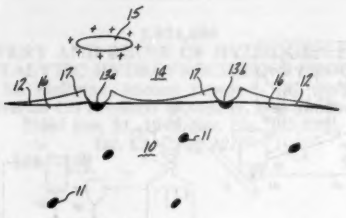
Michael J. Pryor, Woodbridge, Conn., assignor to Olin Corporation

Filed Jan. 12, 1968, Ser. No. 697,479

Int. Cl. C23f 13/00
U.S. Cl. 204—197 **9 Claims**

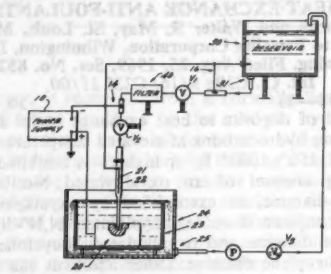
Inclusion of elemental anode materials into cathodic metallic matrices will give significant improvements in corrosion resistance, provided that the elemental anode will corrode anodically, yield a colloidal or finely dispersed

hydrous metal oxide in the corrosive electrolyte which will assume a positive charge. Such positively charged hydrous



oxides will migrate electrophoretically and deposit protective films on the matrix metal cathode.

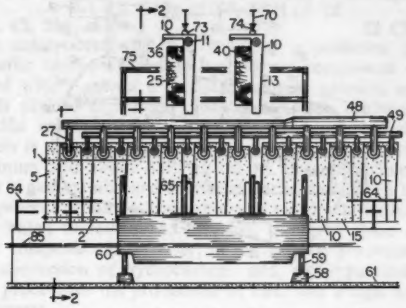
3,574,082
CURRENT LEAK PROTECTIVE CIRCUIT
James D. Andrews, Cincinnati, and John L. Bemesderfer, Hamilton, Ohio, assignors to General Electric Company
Filed May 29, 1968, Ser. No. 732,974
Int. Cl. B01k *3/00*; B23p *1/04*
U.S. Cl. 204—228 **5 Claims**



An electrolytic apparatus for the removal of electrically conductive material from a workpiece utilizing a plurality of current bypass leak paths so placed as to cause short circuit current to bypass certain components of the electrolytic apparatus.

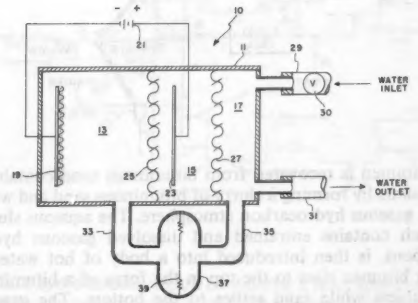
3,574,083
APPARATUS FOR THE PRODUCTION OF CHLORINE IN CHLOR-ALKALI DIAPHRAGM CELLS
Bernard B. Pewitt, 11007 Sagewillow Lane, Houston, Tex. 77034
Filed Nov. 3, 1969, Ser. No. 873,157
Int. Cl. B01k *3/00, 3/10*
U.S. Cl. 204—258 **13 Claims**

This invention provides a new and novel arrangement and devices for a chlor-alkali battery wherein the cells are made from prestressed and polymer impregnated concrete for better resistance to chlorine corrosion, and the cells are divided into cathode and anode sections with external electrical contact strips for electrical continuity and arranged so that the cathode sections may be vertically removed from the battery line for replacement or repair of the cathode screen or diaphragm without otherwise disturbing the anode units. The cells, within each battery line, are held together between end members by using corrosion protected steel cables that are stressed and anchored through each end member. In addition the chlor-alkali battery lines may be arranged between canals so that a straddle-barge device may be utilized to place the cells into the battery line and individual cell units may be thus vertically removed and replaced without otherwise disturbing adjacent cells in the chlor-alkali battery line. A cell washing and treating device, including a



series of internal spray jets, is incorporated into each cell for treatment to restore permeability of the diaphragms without cell disassembly.

3,574,084
SPECIALIZED HALOGEN GENERATOR FOR PURIFICATION OF WATER
Robert A. Bruce, Newport News, Va., assignor to the United States of America as represented by the Administrator of the National Aeronautics and Space Administration
Filed Oct. 9, 1969, Ser. No. 865,109
Int. Cl. B01k *3/10*
U.S. Cl. 204—263 **11 Claims**

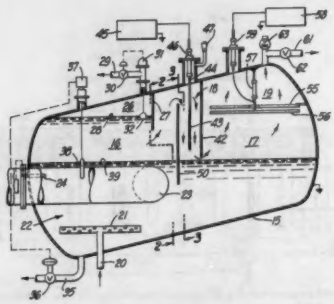


Apparatus for treating water with a specialized halogen gas including a vessel having an electrolyte containing chamber, an anodic chamber and a water treatment chamber with means to remove the halogen from the electrolyte and permit it to be dissolved in water passing through the water treatment chamber.

3,574,085
ELECTRIC TREATER FOR EMULSIONS
William Woelflin, Long Beach, Calif., assignor to Petrolite Corporation, St. Louis, Mo.
Filed Apr. 7, 1969, Ser. No. 814,116
Int. Cl. B03c *5/02*; C10g *33/02*
U.S. Cl. 204—302 **13 Claims**

An electric treater with electrodes in a horizontal treating compartment above an emulsion-water interface, with the emulsion tending to flow in a horizontal path

along the interface. A baffle across the interface for directing flow up away from the interface and through or past the electrodes. A tilted horizontal treater. A treater with a



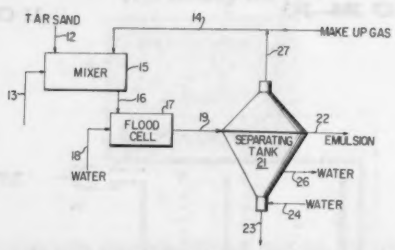
gas separation zone, an electric treating zone, and a settling zone, with a baffle at the treating zone at the emulsion-water interface to control emulsion flow through the treating zone.

3,574,086

RESTORATION OF LIGHT HYDROCARBON GASES TO TAR SAND

Alexander W. Hyndman, Edmonton, Alberta, Canada, assignor to Cities Service Athabasca, Inc., Imperial Oil Limited, Atlantic Richfield Corporation, and Royalite Oil Company, Limited, fractional part interest to each

Filed Aug. 28, 1968, Ser. No. 755,975
Int. Cl. C07g 1/04
U.S. Cl. 208—11 **7 Claims**



Bitumen is recovered from bituminous sand containing the same by forming a slurry of bituminous sand and water in a gaseous hydrocarbon atmosphere. The aqueous slurry, which contains entrained and dissolved gaseous hydrocarbons, is then introduced into a body of hot water so that bitumen rises to the top in the form of a bituminous emulsion while sand settles to the bottom. The gaseous hydrocarbon atmosphere is preferably maintained throughout the process and between about 0.05 and about 5 wt. percent hydrocarbon gas based upon bitumen content of the slurry is preferably contained in the slurry.

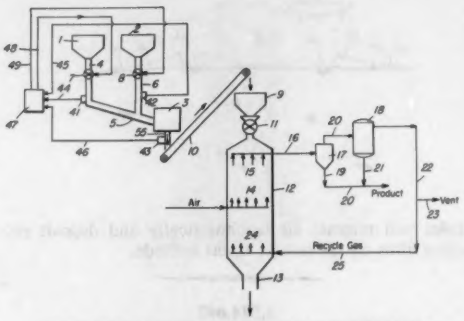
3,574,087

METHOD AND APPARATUS FOR RETORTING OIL SHALES

William S. Bergen, Wenonah, N.J., assignor to Mobil Oil Corporation

Filed Oct. 1, 1968, Ser. No. 764,130
Int. Cl. C10q 1/02
U.S. Cl. 208—11 **16 Claims**

A system for retorting oil shales known as relatively lean and relatively rich oil shales is described wherein the shales are mixed to provide an oil shale having a general or average Fischer assay oil content in the range of from about 15 to about 36 gallons per ton and retorting the mixture thus formed in a gas combustion retort under conditions to recover higher yields of oil products than



would be obtained when processing each of the different oil shales separately.

3,574,088

USE OF OXYALKYLATED PHENYLENE DIAMINES AS HEAT EXCHANGE ANTI-FOULANTS

Lewis Bsharah and Walter R. May, St. Louis, Mo., assignors to Petrolite Corporation, Wilmington, Del.

No Drawing. Filed Aug. 25, 1969, Ser. No. 852,940
Int. Cl. C10g 9/16; C23f 11/00
U.S. Cl. 208—48 **10 Claims**

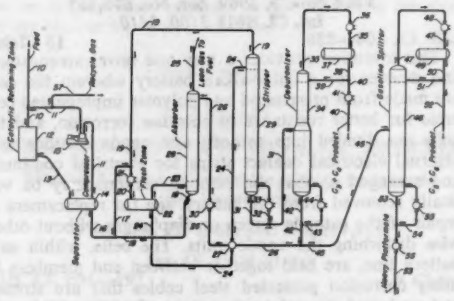
Adhesion of deposits to heat exchange metal surfaces in processing hydrocarbons at elevated temperatures (i.e. from about 150°–1000° F. or higher) is inhibited by an anti-fouling amount of an oxyalkylated N-substituted phenylene diamine, as exemplified by oxyalkylated N-phenyl-p-phenylene diamine, oxyalklated N,N'-diphenyl-p-phenylene diamine and oxyalkylated N-cyclohexyl-N'-phenyl-p-phenylene diamine. Other additives can also be employed in conjunction with the above anti-foulants.

3,574,089

GAS SEPARATION FROM HYDROGEN CONTAINING HYDROCARBON EFFLUENT

James T. Forbes, Arlington Heights, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 27, 1969, Ser. No. 794,088
Int. Cl. C10g 5/04
U.S. Cl. 208—101 **2 Claims**



Method for separating the effluent from a catalytic reforming zone utilizing absorption and fractionation tech-

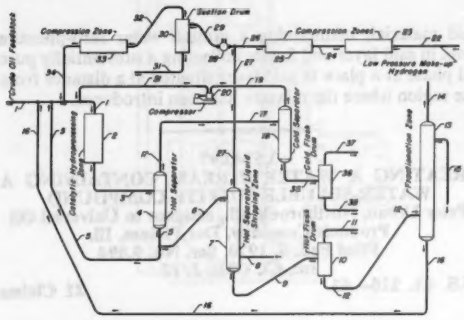
niques. The inventive processing scheme permits high recovery of normally gaseous hydrocarbons as well as reformate.

3,574,090

RECOVERY AND REUSE OF HYDROGEN FROM A CATALYTIC HYDROPROCESSING PROCESS

Newt M. Hallman, Mount Prospect, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 31, 1969, Ser. No. 795,599
Int. Cl. C10g *13/00*
U.S. Cl. 208—108 **9 Claims**



Hydrogen is recovered from a normally liquid hydrocarbon fraction produced by the catalytic hydroprocessing of a petroleum crude oil feedstock and reused in the catalytic hydroprocessing unit by utilizing a hot separator liquid stripping zone, high pressure superheated steam as the stripping medium and an admixing step wherein the recovered stripped hydrogen is admixed at an intermediate pressure in a compression zone with an added low pressure makeup hydrogen stream.

3,574,091

CONTINUOUS, LOW PRESSURE CATALYTIC REFORMING PROCESS WITH SULFUR INCLUSION AND WATER EXCLUSION

John C. Hayes, Palatine, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Continuation-in-part of application Ser. No. 560,903, June 27, 1966. This application June 24, 1968, Ser. No. 739,201
Int. Cl. C10g *35/08*
U.S. Cl. 208—138 **10 Claims**

A hydrocarbon charge stock boiling in the gasoline range is continuously reformed by contacting, in a substantially water-free reforming zone, the hydrocarbon charge stock, hydrogen and sulfur or a sulfur-containing compound with a reforming catalyst containing a platinum group component at reforming conditions including a pressure of about 50 to 350 p.s.i.g. The sulfur or sulfur-containing compound is continuously introduced into the reforming zone, both during start-up and thereafter, in an amount, calculated as elemental sulfur, equivalent to about 300 to about 3000 wt. p.p.m. of the hydrocarbon charge stock. Furthermore, the amount of sulfur or the sulfur-containing compound introduced into the reforming zone is not increased after start-up of the process. Key feature of the resulting process is the ability to continuously operate under this low pressure condition in a stable fashion for a catalyst life of at least 15 barrels of charge per pound of catalyst without catalyst regeneration.

3,574,092

HYDROCARBON CONVERSION PROCESS AND CATALYST THEREFOR

Roy T. Mitsche, Island Lake, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Feb. 10, 1969, Ser. No. 798,124
Int. Cl. G10g *35/08*; B01j *11/08*
U.S. Cl. 208—139 **12 Claims**

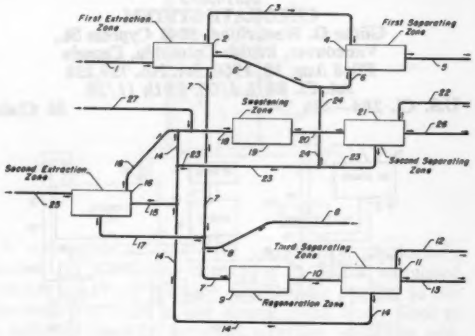
A catalytic composite comprising a platinum group metallic component and a technetium component combined with a carrier material containing alumina and a finely divided crystalline aluminosilicate, is disclosed. A specific example of the catalytic composites disclosed herein is a combination of about 0.01 to 1.0 wt. percent platinum and about 0.01 to 1.0 wt. percent technetium with a gamma alumina carrier material having 0.5 to 20 wt. percent of the hydrogen form of mordenite uniformly distributed therethrough. Principal utility of these catalytic composites is, broadly, in the field of processes for the conversion of hydrocarbons and, more particularly, in a process for the production of LPG and a high octane reformate.

3,574,093

COMBINATION PROCESS FOR TREATMENT OF HYDROCARBON STREAMS CONTAINING MERCAPTO COMPOUNDS

James R. Strong, Evanston, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Jan. 22, 1969, Ser. No. 793,101
Int. Cl. C10g *19/02, 19/08*
U.S. Cl. 208—206 **6 Claims**



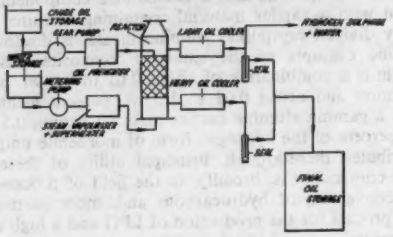
A first hydrocarbon stream containing a mercapto compound is treated to remove mercapto compounds therefrom without adding any substantial amounts of undesired disulfide compounds thereto and a second hydrocarbon stream containing a mercapto compound is simultaneously sweetened by a combination process involving: a first extraction step which is performed on the first hydrocarbon stream with a disulfide-free alkaline stream, a second extraction step which is performed on the second hydrocarbon stream, an alkaline stream regeneration step, and a combination sweetening and disulfide-extraction step which is performed on the second hydrocarbon stream in order to sweeten same while simultaneously preparing the disulfide-free alkaline stream for use in the first extraction step. Key feature of the resulting process is the use of the sweetening step to remove mercaptide and disulfide compounds from a portion of the regenerated alkaline stream so that the amount of re-entry disulfide compounds that are carried back into the first extraction step by the alkaline stream is held to a minimal level.

3,574,094

DESULPHIDING A LIQUID WITH STEAM AND URANIUM OXIDE CATALYST

Thomas Nicklin, Manchester, and Frederick Farrington, Sale, England, assignors to The Gas Council, London, England

Filed June 20, 1968, Ser. No. 738,456
Int. Cl. C10g *23/14*
U.S. Cl. 208—214 5 Claims



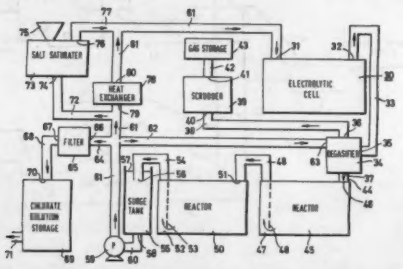
Desulphiding of liquid pertoleum fraction is effected by contacting the fraction in the liquid state with steam and with a catalyst of uranoso-uranic oxide and/or uranium trioxide. The steam and liquid fraction are passed co-currently upward or counter-currently through the catalyst in the reactor vessel. Alternately the liquid fraction may pass into the reactor at the level of the catalyst whilst steam is passed upward through the catalyst. A vaporized mixture is removed from an upper portion of the reactor while a desulphurized liquid fraction is removed from the lower part of the reactor.

3,574,095

CHLORATE SYSTEM

Göthe O. Westerlund, 5041 Cypress St., Vancouver, British Columbia, Canada

Filed Aug. 30, 1968, Ser. No. 759,258
Int. Cl. B01k *1/00;* C01b *11/26*
U.S. Cl. 204—236 38 Claims



Novel electrolysis systems of the closed loop variety are provided in which novel degasifier means are provided in the closed loop and which are so constructed and arranged as to remove at least 99% of the entrained and/or entrapped gaseous products of electrolysis from the liquid primary products of electrolysis, in combination with novel reactor means, surge tank means and liquid temperature control varying means.

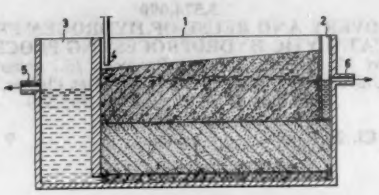
3,574,096

PROCESS AND APPARATUS FOR THE SEPARATION OF OIL FROM AN OIL-WATER MIXTURE

Bo R. Carlstedt, Grastigen 1, Saltsjobaden, Sweden

Filed Mar. 24, 1969, Ser. No. 809,907
Claims priority, application Sweden, Apr. 8, 1968, 4,722/68
Int. Cl. B01d *17/04*
U.S. Cl. 210—23 5 Claims

A process and an apparatus for the separation of oil from an oil-water mixture comprising introducing an oil-water mixture to a surface region of a layer of grainy oil-resistant material housed in a tank, flowing an aqueous phase substantially vertically down through the layer of



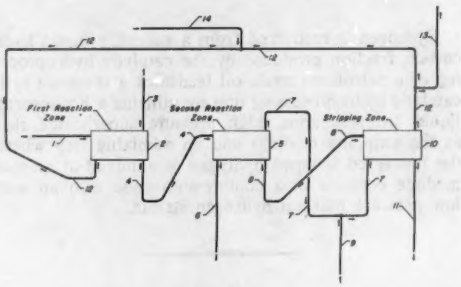
said material, maintaining a ground water zero-pressure level in said layer and finally collecting a substantially pure oil phase at a place in said layer situated at a distance from the region where the mixture has been introduced.

3,574,097

TREATING A WATER STREAM CONTAINING A WATER-SOLUBLE SULFITE COMPOUND

Peter Urban, Northbrook, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

Filed Feb. 9, 1970, Ser. No. 9,894
Int. Cl. C02b *1/18*
U.S. Cl. 210—61 21 Claims



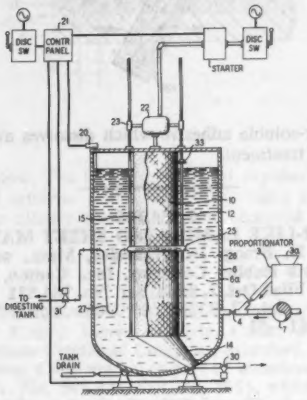
A water stream containing a water-soluble sulfite compound is treated in order to reduce its total sulfur content while minimizing the formation of sulfate by-products by the steps of: (a) converting the sulfite compound contained in the water stream to the corresponding thiosulfate compound; (b) reacting the resulting thiosulfate compound with carbon monoxide at reduction conditions selected to produce the corresponding sulfide compound; and thereafter (c) stripping hydrogen sulfide from the effluent stream from step (b) to form a substantially sulfate-free treated water stream which is substantially reduced in total sulfur content relative to the input water stream. Principal utility of this treatment procedure is associated with the regeneration of a sulfite-containing absorbent stream which is commonly produced by contacting a flue gas stream containing sulfur dioxide with a suitable aqueous absorbent stream containing an alkaline reagent. The treated water stream produced by the present method can then be reused in the absorption process or discharged into a suitable sewer without causing pollution problems. Key features of this method involves the selective conversion of the sulfite compound to the corresponding thiosulfate compound, the subsequent reduction of the thiosulfate compound to the corresponding sulfide compound in a highly efficient, economic and selective manner, and the minimization of undesired sulfate by-products during both of these conversion steps.

3,574,098

PROCESS OF CLARIFYING A LIQUID USING SCORCHED NEWSPRINT

Salem Boorujy, Chatham, N.J., assignor to Environmental Sciences, Inc., Berkeley Heights, N.J.

Filed Sept. 5, 1969, Ser. No. 855,626
Int. Cl. B01d 37/02
U.S. Cl. 210—62 6 Claims



Apparatus and method for the tertiary treatment of sewage with finely ground, de-oiled and scorched waste newsprint to remove from such sewage suspended particles such as those having a biochemical oxygen demand is disclosed together with the method of preparing the waste newsprint for use in such treatment.

3,574,099

STOPPING LOST CIRCULATION IN WELL DRILLING

John N. Ryals, Duane B. Anderson, and Billy V. Randall, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla.

Filed July 6, 1967, Ser. No. 651,943
Int. Cl. C10m 3/04, 1/08, 3/14
U.S. Cl. 252—8.5 13 Claims

A mixture of asbestos fibers and granular particles within critical limits is used to stop loss of drilling fluid to drilled formations.

3,574,100

WATER-SOLUBLE LUBRICATING AGENTS FOR CONTINUOUSLY MOVING CONVEYOR SYSTEMS

Clayton A. Wetmore, Skaneateles, N.Y., assignor to Cowles Chemical Company, Cleveland, Ohio

No Drawing. Filed Jan. 10, 1968, Ser. No. 696,689
Int. Cl. C10m 1/24, 1/26, 1/46
U.S. Cl. 252—32.5 1 Claim

Lubricating compositions, which exhibit controlled foaming and are useful over a wide range of water hardness, are disclosed. The lubricating compositions are useful in lubricating and cleaning conveyor belts, chains and the like systems. The lubricating compositions preferably contain an ampholyte, which is preferably a derivative of a fatty primary amine and a salt of a phosphate ester of an oleyl alcohol ethoxylate. Methods for the use of these compositions are also disclosed.

3,574,101

ACYLATING AGENTS, THEIR SALTS, AND LUBRICANTS AND FUELS CONTAINING THE SAME

John P. Murphy, Willoughby, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

No Drawing. Filed Apr. 29, 1968, Ser. No. 725,189
Int. Cl. C10m 1/40
U.S. Cl. 252—33 16 Claims

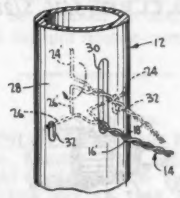
Oil-soluble carboxylic acid acylating agents are prepared by reacting a high molecular weight mono- or polycarboxylic acid with a sulfonating agent. The resulting acylating agents can be converted to acidic, neutral, or basic metal salts. Both the novel acylating agents and the salts are useful additives for lubricants and fuels and as intermediates for the preparation of other useful lubricant and fuel additives, particularly high molecular weight oil-soluble acylated nitrogen compositions and esters. The latter are prepared by reacting the acylating agents with, for example, alkylene polyamines or mono- or polyhydric alcohols.

3,574,102

COLLAPSIBLE ARTIFICIAL TREE CONSTRUCTION ADAPTED FOR CHRISTMAS DECORATION

Terry Hermanson, New York, N.Y., assignor to Mr. Christmas, Inc., New York, N.Y.

Filed Feb. 18, 1969, Ser. No. 800,218
Int. Cl. A47g 33/08
U.S. Cl. 161—14 11 Claims



A collapsible artificial tree construction particularly adapted for Christmas decoration in which simulated branches are freely foldable substantially parallel to the simulated tree trunk in one direction and freely pivot to an unfolded laterally extending direction when the artificial tree is to be erected and used, and in which the branches freely gravitate to an unfolded condition whereby insertion of the tree trunk into a tubular container automatically folds the branches upwardly and along the trunk, and removal of the tree from a tubular container results in the branches being automatically unfolded.

3,574,103

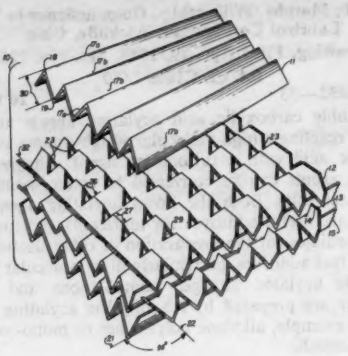
LAMINATED CELLULAR MATERIAL FORM

Aaron Latkin, Livermore, Calif., assignor to the United States of America as represented by the United States Atomic Energy Commission

Filed Sept. 6, 1968, Ser. No. 757,978
Int. Cl. B32b 3/28
U.S. Cl. 161—43 6 Claims

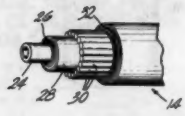
A cellular material form having a core formed of a plurality of corrugated laminar sheet elements, in which apices of corrugations on at least one side of a first sheet are notched transversely to receive and interlock with apices of the corrugations of a second sheet providing a

plurality of interconnected or closed cells in a low density configuration which fitted together under compression



is semi-rigid or is rigid and of high strength to weight ratio when appropriately bonded.

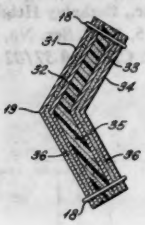
3,574,104
GLASS FIBER CONSTRUCTIONAL MEMBER
Albert Medler, Jackson, Mich., assignor to Plastigage Corporation, Jackson, Mich.
Filed Jan. 24, 1968, Ser. No. 700,287
Int. Cl. B32b *5/10, 5/28*
U.S. Cl. 161—47 **14 Claims**



A construction member formed of glass fiber elements impregnated with a hardened resin wherein the member has sufficient strength characteristics to be used in conjunction with other construction members, or may be used separately, such as to form a pole or the like. Superior strength characteristics are obtained by interposing glass fiber rod type elements between glass fiber fabric layers impregnated with a hardened resin wherein the resin bonds the fabric layers to each other and to the rods to produce an all glass fiber and resin member capable of withstanding high bending moment, and lateral forces, without excessive deflection.

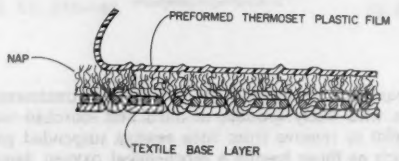
3,574,105
LAMINATED STRUCTURE AND METHOD OF MAKING SAME
Charles M. Sachs, Fort Lee, N.J., assignor to International Playtex Corporation
Original application Apr. 18, 1963, Ser. No. 273,988, now Patent No. 3,266,495, dated Aug. 16, 1966. Divided and this application Nov. 2, 1965, Ser. No. 554,227
Int. Cl. B32b *5/18, 3/06, 3/12*
U.S. Cl. 161—51 **12 Claims**

A laminated structure and method of making the same, especially useful for the breast cups of a brassiere, comprising a layer of resilient polyurethane foam permanently bonded to a first porous fabric layer, and a second porous fabric layer attached at its edges to, but separated over its major area from the first fabric layer by an air space. Initially, the two aforesaid fabric layers are united



by a water-soluble adhesive which dissolves away under a washing treatment.

3,574,106
LEATHER-LIKE LAMINATED SHEET MATERIALS
Lawrence D. Bragg, Jr., Wellesley, Mass., assignor to Plymouth Rubber Company, Inc., Canton, Mass.
Filed Oct. 2, 1968, Ser. No. 764,531
Int. Cl. B32b *3/00;* **D06n** *3/00*
U.S. Cl. 161—53 **7 Claims**

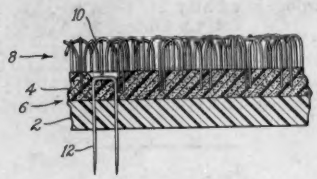


Leather-like laminated sheet materials useful for upholstery, luggage, shoe materials or the like, comprising a fibrous somewhat stretchable textile base layer and an overlying separate, distinct, relatively thin pre-formed thermoset plastic elastic skin layer of uniform thickness mounted thereabove and adhesively anchored to the top ends and upper portions of upwardly extending (preferably napped) fibers of the upper surface of said base layer, the two said opposing layers together providing, to an exceptional degree, a flexible, soft-hand, conformable tough laminate but leaving said thin pre-formed plastic elastic skin layer to a substantial degree free locally elastically to stretch and retract, shift and wrinkle with respect to the underlying base layer, thus simulating grain leather physical characteristics and appearance. In addition, the exposed surface of the pre-formed skin layer of the laminate of the invention may or may not include a surface finish (colored or ornamented or not as preferred) including a slight difference in relief—patterned or not, an additional top finish layer, or both, obtained by casting, embossing, coating or printing, even rotogravure printing, or by incorporating special finely divided, solid ingredients in the skin layer itself to provide a dull, matte, metallic, or gloss surface finish as may be desired for various intended uses.

3,574,107
ARTIFICIAL SKIING SURFACES
Joseph L. Hurka, Boxford, Mass., assignor to USM Corporation, Flemington, N.J.
Filed Apr. 5, 1968, Ser. No. 719,157
Int. Cl. D04b *11/00*
U.S. Cl. 161—67 **4 Claims**

An artificial skiing surface comprising a plurality of layers of material, each layer having properties similar to corresponding layers of natural snow, including a bottom layer of relatively hard material corresponding to

hard packed base snow, an upper layer of upstanding filaments corresponding to surface powder snow, and at least one layer between the bottom and upper layers of relatively sponge-like material corresponding to packed

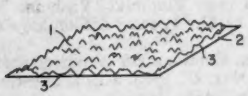


powder snow. The layers are bonded together to form a laminated artificial skiing surface providing for a skiing experience closely resembling that observed in natural snow.

3,574,108
SOUND DEADENING METAL LAMINATE
Armand Francis Lewis, Fairfield, Conn., assignor to American Cyanamid Company, Stamford, Conn.
No Drawing. Continuation-in-part of abandoned application Ser. No. 506,439, Oct. 21, 1965, which is a continuation-in-part of abandoned application Ser. No. 449,791, Apr. 21, 1965. This application May 13, 1968, Ser. No. 728,780
Int. Cl. B32b *3/10*; G10k *11/04*
U.S. Cl. 161—113 **10 Claims**

Metal laminates comprising a thinner outer metal skin layer and a thicker perforated core layer bonded together with a polyurethane resin-based adhesive are disclosed. The core layer can be provided with a second outer metal layer. The core layer has a thickness of 5 to 1000 mils, the outer layers have a thickness of 1 to 100 mils, with the thickness ratio of the core layer to the outer layer being at least 4:1. The open area of the core layer can range from 40 to 70%; the perforations are substantially void of adhesive.

3,574,109
HEAT INSULATING LAMINATE
Yutaka Yoshikawa, 2–24 Hatsudai, Shibuya-ku, Tokyo, Japan
Filed Mar. 27, 1968, Ser. No. 716,471
Claims priority, application Japan, May 9, 1967, 42/28,895
Int. Cl. B32b *3/28*
U.S. Cl. 161—128 **3 Claims**



This invention is to provide a heat insulating material convenient in handling, consisting of an aluminum foil and a thermo-contractile plastics film bonded with each other at scattered points all over the surface of the film in advance as a composite sheet and method of forming a heat insulating layer, which is very easy in working, on an object to be heat-insulated, wherein the composite sheet is fixed to the object and heated to produce wrinkles by the shrinkage of the film and air spaces between the aluminum foil and plastics film.

3,574,110
WIREDRAWING LUBRICATION
Deryk F. G. Hampson, Wantage, and Mervyn R. White, Didcot, England, assignors to Esso Research and Engineering Company
No Drawing. Filed June 18, 1969, Ser. No. 834,555
Claims priority, application Great Britain, June 20, 1968, 29,390/68
Int. Cl. C10m *1/06, 1/38*
U.S. Cl. 252—33 **13 Claims**

A concentrate for use in forming an aqueous wiredrawing lubricant comprising a mixture of sulphated sperm oil and sulphated rapeseed oil. The concentrate may be mechanically dispersed in the water to form the lubricant or a surfactant may be included in the concentrate to aid dispersion.

3,574,111
COMPLEX ALUMINUM-MONOHYDRATED ALKALINE EARTH METAL SALT LUBRICANT
Arnold J. Morway, Clark, N.J., assignor to Esso Research and Engineering Company
No Drawing. Filed Apr. 1, 1968, Ser. No. 717,938
Int. Cl. C10m *5/16*
U.S. Cl. 252—36 **5 Claims**

A grease composition comprising a lubricating oil, a complex aluminum salt and a monohydrated alkaline earth metal salt of a C_2 to C_3 fatty acid displays the properties of good structural stability and excellent load-carrying ability. Specifically a monohydrated calcium acetate imparts, to a grease containing a complex aluminum salt of aluminum alcoholate, a higher fatty acid and an aromatic acid, structural stability and load carrying properties which could not be obtained by employing an aqueous or multihydrated calcium acetate compound.

3,574,112
CONTINUOUS CASTING PROCESS
John W. Nelson, Lansing, Mich., assignor to Atlantic Richfield Company, New York, N.Y.
No Drawing. Filed Nov. 13, 1968, Ser. No. 775,535
Int. Cl. C10m *1/26, 1/24*
U.S. Cl. 252—56 **12 Claims**

A composition is prepared suitable for lubricating the interface of liquid metal and mold during the continuous casting of metals. This lubricating composition contains an aliphatic or aromatic carboxylic acid having 2 to about 40 carbon atoms, e.g., the acids obtained by hydrolysis of and contained in Crambe and rapeseed oils and mixtures of them, and a mineral lubricating oil having a low carbon residue and low aromatic carbon content which can be prepared by a two-stage catalytic hydrogenation process.

3,574,113
METHOD OF PRODUCING CALCIUM SILICATE TYPE HIGH TEMPERATURE THERMAL INSULATION MATERIALS
Richard F. Shannon, Lancaster, Ohio, assignor to Owens-Corning Fiberglas Corporation
No Drawing. Filed Apr. 18, 1968, Ser. No. 722,201
Int. Cl. C04b *43/04, 15/12*
U.S. Cl. 252—62 **14 Claims**

An improved method of forming high strength high temperature insulation materials wherein an undisrupted tobermorite gel network having the formula

$$3CaO \cdot 2SiO_2 \cdot 3H_2O$$

is first formed between dispersed fibers in a slurry and this network is thereafter transformed in an autoclaving process to calcium silicate crystals having a calcia to silica ratio of less than approximately one. The conversion of

the tobermorite gel to crystals is accomplished by the diffusion of silica into the gel network. Free lime and silica are distributed throughout the gel, and during autoclaving, the silica is dissolved by the free lime and made available for diffusion into the crystalline lattice of the tobermorite gel. The tobermorite gel network is set to the fibers by the heating of calcium silicate slurries consisting of either dicalcium silicate, or tricalcium silicate, or both in an abundance of water at temperatures between 160° F. and 212° F. The formation of the gel between the fibers must be complete and must not be disrupted, or dried, prior to the autoclaving process.

3,574,114

FINE GRAIN CERAMIC FERRITES

Frank R. Monforte, Passaic Township, Morris County, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

No Drawing. Filed Aug. 5, 1968, Ser. No. 750,027
Int. Cl. C04b 35/26
U.S. Cl. 252—62.6 6 Claims

The incorporation of critical amounts of magnesium sulfate as a starting ingredient results in controlled uniform fine grain size in a variety of ceramic materials produced by otherwise conventional calcining and firing. Concerned compositions included magnetic ferrites of a type not ordinarily containing magnesium.

3,574,115

MAGNETIC COMPOSITIONS OF CERIUM MODIFIED CHROMIUM OXIDE AND METHODS OF MANUFACTURE

Robert S. Haines, Boulder, Colo., assignor to International Business Machines Corporation, Armonk, N.Y.

No Drawing. Filed June 30, 1969, Ser. No. 837,870
Int. Cl. C04b 35/12
U.S. Cl. 252—62.51 8 Claims

Cerium modified ferro-magnetic chromium oxide compositions containing 56% to 61.8% chromium and 0.1% to 6% cerium, both combined with oxygen, in the form of finely divided particles. These particles are of tetragonal crystalline structure and have a length-to-width ratio of as much as 22 to 1 and an actual length in the range of about 0.5 to 13 microns. The process of forming cerium modified chromium oxide ferro-magnetic compositions consists of mixing a chromium compound with a source of cerium, and then subjecting the mixture to heat and pressure.

3,574,116

MANGANESE-ZINC FERRITE WITH COBALT ADDITIVE FOR PRODUCING A DESIRED TEMPERATURE COEFFICIENT OF INITIAL PERMEABILITY

Izuru Sugano, Taneaki Okuda, Tsuneo Akashi, Yoshihiro Kenmoku, and Toshiro Tsuji, Tokyo, Japan, assignors to Nippon Electric Company, Limited, Tokyo, Japan

Filed July 23, 1968, Ser. No. 746,837
Claims priority, application Japan, July 25, 1967, 42/48,318
Int. Cl. C04b 35/38, 35/34
U.S. Cl. 252—62.59 1 Claim

Oxide magnetic materials of the manganese-zinc ferrite type are given improved temperature coefficients of initial permeability by the addition or substitution of a cobalt compound so that the resultant material contains 0.01 to 1.0 mol percent Co_2O_3. Calcium and silicon compounds to give ultimate mol percents of 0.1 to 0.6 mol percent CaO and 0.01 to 0.07 mol percent SiO_2 respectively may be added to improve the loss characteristics without deleterious effects upon the aforesaid temperature coefficients.

3,574,117

HYDRAULIC FLUID CONTAINING ALKYL 1,2,3,4,7,7 - HEXACHLOROBICYCLO-[2.2.1]-HEPT-2-ENE-5-CARBOXYLATE BASE

Bruce W. Hotten, Orinda, Calif., assignor to Chevron Research Company, San Francisco, Calif.

No Drawing. Filed May 21, 1968, Ser. No. 730,955
Int. Cl. C09k 3/00
U.S. Cl. 252—75 17 Claims

Flameproof hydraulic fluid and method of transmitting power employing fluid having as a base an alkyl 1,2,3,4,7,7-hexachlorobicyclo-[2.2.1]-hept-2-ene-5-carboxylate.

3,574,118

AEROSOL FOAM COMPOSITION SUITABLE FOR DISPENSING WHEN WARM

Wayne Otto Baker, East Grand Rapids, Mich., assignor to Colgate-Palmolive Company, New York, N.Y.

No Drawing. Filed July 3, 1967, Ser. No. 650,613
Int. Cl. C11d 17/00
U.S. Cl. 252—90 2 Claims

The present invention relates to aerosol foam compositions and, more particularly, to aerosol foam compositions having improved propellant emulsification, having superior shaving characteristics, having sufficient viscosity when warm to hold individual hairs of a beard erect and providing good heat-transfer properties without excessive loss of moisture.

3,574,119

METHOD OF GRANULATING DETERGENT COMPOSITIONS CONTAINING AN ALKALI METAL METABORATE

Iwao Maruta, Chiba, and Yunosuke Nakagawa, Saitama, Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

No Drawing. Filed Jan. 10, 1968, Ser. No. 696,688
Claims priority, application Japan, Feb. 3, 1967, 42/7,000
Int. Cl. C09k 3/00; C11d 9/16, 17/06
U.S. Cl. 252—99 4 Claims

A method of forming a granular detergent composition by incorporating a crystalline alkali metal metaborate in a powdered detergent composition, heating the composition and applying a motion to the composition in order to form a granular product which is not apt to agglomerate.

3,574,120

HIGHLY ALKALINE DETERGENT COMPOSITION CONTAINING AN ENZYME DERIVED FROM THERMOPHILIC *STREPTOMYCES RECTUS* VAR. *PROTEOLYTICUS*

John M. Siebert, North College Hill, and Robert L. Gensler, Cincinnati, Ohio, and Kiyoshi Mizusawa, Eiji Ichishima, and Fumihiko Yoshida, Noda-shi, Japan, assignors to The Procter & Gamble Company, Cincinnati, Ohio

No Drawing. Continuation-in-part of application Ser. No. 777,484, Nov. 20, 1968. This application Aug. 15, 1969, Ser. No. 850,655
Int. Cl. C11d 7/42, 9/40
U.S. Cl. 252—132 10 Claims

Highly alkaline enzyme-containing detergent composition of matter having a pH in the range of 9.5 to 11 and containing an organic synthetic detergent and an alkaline builder in a weight ratio of 10:1 to 1:30, and from .0025% to 10% by weight of the composition of a proteolytic enzyme derived from thermophilic *Streptomyces rectus* var. *proteolyticus* ATCC 21067. The detergent composition is useful as a laundering composition, a soaking composition and other cleaning applications in which it is desired to have the benefit of enzymatic activity.

3,574,121

PROCESS FOR THE MANUFACTURE OF DETERGENT COMPOSITIONS CONTAINING SODIUM TRIPOLYPHOSPHATE

Karl Merkenich, Hurth, near Cologne, Hellmut Gabler, Knapsack, near Cologne, and Wolf-Dieter Pirig, Euskirchen, Germany, assignors to Knapsack Aktiengesellschaft, Knapsack, near Cologne, Germany

No Drawing. Filed Apr. 26, 1966, Ser. No. 545,256
Int. Cl. C11d *3/06, 11/00, 11/02*
U.S. Cl. 252—135 4 Claims

In the process for the manufacture of detergent compositions comprising mixing a slurry of detergent components and an active amount of sodium tripolyphosphate and spray drying the resulting mixture, the improvement comprising mixing said slurry with dry sodium tripolyphosphate, at least a portion of the tripolyphosphate being in its hexahydrate form and spray drying the resulting mixture.

3,574,122

LIQUID DETERGENT COMPOSITIONS

Thomas Aquinas Payne, Jr., Teaneck, and Warren Eric Olson, Verona, N.J., and Samuel Hirsch Cohen,, Bronx, N.Y., assignors to Lever Brothers Company, New York, N.Y.

No Drawing. Filed Aug. 18, 1967, Ser. No. 661,522
Int. Cl. C11d *1/12, 3/066*
U.S. Cl. 252—137 5 Claims

A phase-stable, heavy-duty, liquid detergent emulsion composition comprising a synthetic organic nonionic detergent and trisodium nitrilotriacetate in an aqueous medium containing a ternary emulsion stabilizer system which is a first stabilizer combination of a hydrolyzed linear copolymer of ethylene and maleic anhydride plus a hydrolyzed cross-linked copolymer of ethylene and maleic anhydride, a second stabilizer which is a hydrotrope and a third stabilizer which is an electrolyte.

3,574,123

PAINT STRIPPING COMPOSITION AND PROCESS

Millard J. Laugle, Cincinnati, Ohio, assignor to W. R. Grace & Co., New York, N.Y.

No Drawing. Filed Apr. 23, 1968, Ser. No. 723,567
Int. Cl. C09d *9/04;* C11d *1/28*
U.S. Cl. 252—144 10 Claims

Paints are removed from surfaces using a paint stripper comprising from 50 to 90 parts of a chlorinated liquid hydrocarbon solvent, 2 to 15 parts of a lower aliphatic alcohol or their glycol ethers, 0.1 to 15 parts of a lower carboxylic acid, 2 to 30 parts of hydroxybenzenes such as phenols or their derivatives, 2 to 10 parts fatty acid sulfonate or a salt of a fatty amine carboxylic acid having the formula

RNHR'COOH

where R is an aliphatic group having from 8 to 18 carbons and R' is an alkyl group having from 1 to 8 carbons, or alkylbenzene sulfonic acid or salts thereof, from 0.1 to 10 parts of ammonium bifluoride dissolved in from about 3 up to 20 parts of water, and optionally, evaporation retarders and thickeners.

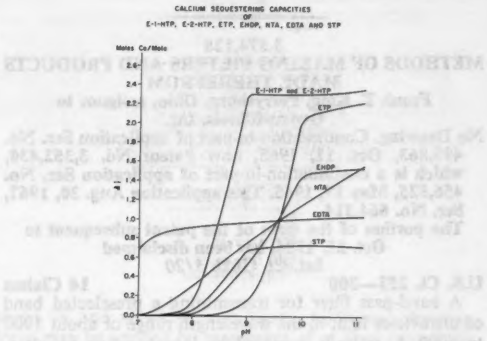
3,574,124

DETERGENT REMOVABLE CLEANING AND POLISHING COMPOSITION

Warren I. Lyness, Mount Healthy, and Lawrence R. Parks, Springfield Township, Hamilton County, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of application Ser. No. 638,044, May 12, 1967. This application Apr. 12, 1968, Ser. No. 721,037
Int. Cl. C11d *1/18, 1/38, 1/50, 3/26, 7/32*
U.S. Cl. 252—153 9 Claims

A detergent removable, aqueous cleaning and polishing composition comprising a polymer having an acid number ranging from about 10 to about 60, a water-soluble calcium, magnesium, barium, or strontium compound, a phosphonate chelating agent selected from the group consisting of ethane-1-hydroxy-1,1,2-triphosphonic



acid (E-1-HTP), ethane-2-hydroxy-1,1,2-triphosphonic acid (E-2-HTP), ethane - 1 - hydroxy - 1,1 - diphosphonic acid (EHDP) and ethane - 1,1,2 - triphosphonic acid (ETP), and sufficient volatile base to adjust the pH of the formulation to from about 9 to about 12.

3,574,125

DETERGENT CONCENTRATE

Nicolaas A. I. van Paassen, Rijswijk, Netherlands, assignor to Chem-Y Fabriek van Chemische Produkten N.V., Bodegraven, Netherlands

No Drawing. Filed Dec. 26, 1967, Ser. No. 693,169
Claims priority, application Great Britain, Dec. 29, 1966, 58,173/66
Int. Cl. C11d *1/12*
U.S. Cl. 252—161 11 Claims

Anionic capillary-active ether sulfates are rendered readily soluble in water at ambient temperatures by adding as an additive an external plasticizer for polymers, such as a phthalate, phosphate or stearate ester, and/or a suitable hydrotropic agent, such as oxyethylation products of higher alcohols or alkyl phenols, and with or without a water-miscible alcohol.

3,574,126

NOVEL ZINC COMPOSITION

Virgil L. Hansley and Stuart Schott, Cincinnati, Ohio, and Louis F. Moormeier, Fairfield, Conn., assignors to National Distillers and Chemical Corporation, New York, N.Y.

No Drawing. Original application Oct. 8, 1965, Ser. No. 494,243. Divided and this application Jan. 15, 1969, Ser. No. 810,063
Int. Cl. C01b *17/66*
U.S. Cl. 253—182 6 Claims

A reactive zinc composition comprises a sodium-zinc alloy admixed with a liquid hydrocarbon, the alloy having a particle size of 1–25 microns and a sodium content of 0.5–4.0 weight percent.

3,574,127

COMPOSITIONS PREPARED BY TREATING DIAMINE-KETONE MIXTURES WITH ANHYDROUS DRYING AGENTS

Anthony S. Scheibelhoffer, Barberton, Ohio, assignor to The Goodyear Tire & Rubber Co., Akron, Ohio

No Drawing. Original application Jan. 30, 1967, Ser. No. 612,347, now Patent No. 3,463,748, dated Aug. 26, 1969. Divided and this application Aug. 22, 1969, Ser. No. 852,482
Int. Cl. C07b *5/02*
U.S. Cl. 252—184 9 Claims

A composition and its method of preparation, prepared by treating a mixture of at least one diamine, where the

amino groups of the diamine are connected to non-benzenoid carbon atoms and at least one liquid ketone with a drying agent inert to diamines and ketones. The composition is particularly useful as a curative for isocyanate-terminated polyurethanes.

3,574,128

METHODS OF MAKING FILTERS AND PRODUCTS MADE THEREFROM

Frank T. King, Perrysburg, Ohio, assignor to Owens-Illinois, Inc.

No Drawing. Continuation-in-part of application Ser. No. 495,863, Oct. 11, 1965, now Patent No. 3,352,430, which is a continuation-in-part of application Ser. No. 456,525, May 17, 1965. This application Aug. 30, 1967, Ser. No. 664,314

The portion of the term of the patent subsequent to Oct. 21, 1986, has been disclaimed

Int. Cl. G02b *3/20*

U.S. Cl. 252—300 14 Claims

A band-pass filter for transmitting a preselected band of ultraviolet light in the wavelength range of about 1900 to 4000 A. units is prepared by incorporating an ultraviolet light absorbing compound in a transparent, machinable solid organopolysiloxane prepared in a particular way. The ultraviolet light absorbing compound provides (in combination with the resin) a spectrum with at least two intense absorption bands with a pronounced minima between the absorption maxima. The organopolysiloxane is prepared by heating a silane represented by the formula $TSiZ_3$ in which T is an alkyl group such as methyl or an alkenyl group such as vinyl or an aryl group such as phenyl and Z is an alkoxy group such as ethoxy, with water, concentrating the resultant reaction mixture by heating it at a temperature of about 100° to 300° C. to remove by-product alkanol and water, precuring the concentrated product by heating at a temperature of about 90° to 185° C. to provide a further curable organopolysiloxane. The ultraviolet light absorbing compound generally is mixed with the further curable organopolysiloxane which is then formed into an article adapted for use as a filter in said preselected wavelength.

3,574,129

METHOD FOR PREVENTING HYDROLYSIS OF A RARE EARTH OXIDE HOST PHOSPHOR IN A COATING SLURRY

Michael J. Hammond, Raymond F. Herner, and Felix F. Mikus, Towanda, Pa., assignors to Sylvania Electric Products Inc.

No Drawing. Filed Feb. 28, 1969, Ser. No. 803,430

Int. Cl. C09k *1/10*

U.S. Cl. 252—301.3 3 Claims

Disclosed are methods for preventing the hydrolysis of a rare earth oxide host phosphor contained in a slurry of an organic binder sensitized with a dichromate ion by adjusting the pH of the slurry to between about 8 and 11. Also disclosed is a method for applying a slurry of this material to a substrate.

3,574,130

EUROPIUM ACTIVATED RARE EARTH PHOSPHORS CONTAINING TRIVALENT CERIUM BRIGHTNESS CONTROL

James E. Mathers, Ulster, and Emil J. Mehalchick, Towanda, Pa., assignors to Sylvania Electric Products Inc.

No Drawing. Filed Jan. 16, 1969, Ser. No. 791,771

Int. Cl. C09k *1/10, 1/14, 1/44*

U.S. Cl. 252—301.4 6 Claims

An improved process for the manufacture of europium-activated rare earth oxide phosphors, europium-activated rare earth phosphors derived from rare earth oxides and mixtures thereof and the improved phosphors are disclosed. The improvement comprises controlling the brightness of the phosphor by incorporating a controlled amount of cerium into the europium-activated rare earth oxide at the time of synthesis of the europium-activated rare earth oxide.

3,574,131

PROCESS FOR PREPARING RARE EARTH OXIDE PHOSPHORS

John L. Ferri, Towanda, and James E. Mathers, Ulster, Pa., assignors to Sylvania Electric Products Inc.

No Drawing. Filed Feb. 4, 1969, Ser. No. 796,551

Int. Cl. C09k *1/10*

U.S. Cl. 252—301.4 9 Claims

A process for increasing and controlling the particle size of a rare earth oxide phosphor is disclosed. The process comprises forming a mixture of a fluxing agent and a rare earth source in weight ratios of from about 4:96 to about 25:75, raising the temperature of the mixture to at least about 1100° C. and holding the mixture above about 1100° C. for a sufficient time to form a rare earth oxide phosphor having a particle size of at least about 4 microns. The fluxing agents suitable are the alkali metal hydrogen sulfates, alkali metal pyrosulfates and mixtures thereof. The particle size of the phosphor material is dependent upon the amount of fluxing agent used within the suitable ratio of fluxing agent to rare earth source.

3,574,132

PROCESS OF ENCAPSULATING BASIC NITROGEN COMPOUNDS WITH ALKALI-PRECURSOR GELATIN

Benjamin Mosier, Houston, Tex., and Charles E. Tippett, Dayton, Ohio, assignors to said Mosier and Microcap, Inc., Houston, Tex.

No Drawing. Continuation-in-part of application Ser. No. 433,501, Feb. 17, 1965. This application Jan. 12, 1968, Ser. No. 697,307

Int. Cl. B01j *13/02*; A01n *17/00*; C23f *11/14*

U.S. Cl. 252—316 13 Claims

Process of microencapsulation employing alkali-precursor (Type B) gelatin as the encapsulating macrocolloid, particularly applicable to the formation of liquid center microcapsules containing a basic (cationic) nitrogen compound. For example, an aqueous solution of alkali-precursor gelatin is mixed at an alkaline pH with a water-immiscible organic solvent solution of a nitrogen compound, such as an amine or a quaternary. The pH of the mixture (viz, the gelatin phase) is then reduced to at least 4.5 and preferably 3.8 or below, the liquid phases being intermixed to disperse and emulsify the organic solvent phase in the aqueous phase, thereby providing minute droplets of the basic nitrogen containing organic solvent surrounded by the aqueous solution of the alkali-precursor gelatin. At the low acid pH, the gelatin forms a coating on the droplets and provides encapsulating skins therefor. While the encapsulated droplets can be recovered at the low acid pH, it is preferred to raise the pH to a pH above 5.5 (preferably 7.5–11), and then recover the microcapsules. An auxiliary coating can be applied to the recovered microcapsular material thus produced by contacting the microcapsules with an aqueous solution of acid-precursor gelatin.

3,574,133

ENCAPSULATION PROCESS AND ITS PRODUCT

Robert Gordon Bayless, Yellow Springs, and Donald Day Emrick, Kettering, Ohio, assignors to The National Cash Register Company, Dayton, Ohio

No Drawing. Filed Jan. 29, 1968, Ser. No. 701,127

Int. Cl. B01j *13/02*; B44d *1/02*; A61k *9/04*

U.S. Cl. 252—316 11 Claims

A process is disclosed for producing, en masse, in an aqueous manufacturing vehicle, minute capsules having

walls comprising the product of a complexing reaction between poly(vinyl alcohol) and a slowly hydrolyzable alkylene glycol cyclic borate ester to form a non-gelling product. The process utilizes liquid-liquid phase separation in a homogeneous system which is achieved by combination, in solution in the manufacturing vehicle, of the poly(vinyl alcohol) and the cyclic borate ester material.

In the process, complexed poly(vinyl alcohol) and the cyclic borate ester material emerges from solution in the manufacturing vehicle as a separated liquid phase, relatively high in concentration of poly(vinyl alcohol) and dispersed as a discontinuous liquid phase in the manufacturing vehicle. The separated liquid phase, when agitated, wets and enwraps dispersed, introduced, particles of intended capsule core entities to produce capsules. Optionally, the produced capsule walls can be chemically treated with solutions of certain transition metal salts to chemically harden the capsule walls and make them self-supporting.

3,574,134

PROCESS FOR RAPIDLY GELLING AN ORGANIC LIQUID

Robert J. F. Palchak, Springfield, Va., assignor to The Susquehanna Corporation

No Drawing. Continuation of application Ser. No. 493,270, Oct. 5, 1965. This application May 31, 1968, Ser. No. 752,408

Int. Cl. B01j *13/00;* **C10l** *7/02*

U.S. Cl. 252—316 **15 Claims**

A process for rapidly gelling an organic liquid by cationically polymerizing polyvinyl ether monomers in said organic liquid. This process is useful for rapidly gelling the contents of railroad tank cars, highway tank trucks, storage tanks, etc., which contain liquid organic chemicals, after they have ruptured to prevent further losses and fire hazards.

3,574,135

PRODUCTION OF IMPROVED THICKENED OR THIXOTROPIC COMPOSITIONS FROM FLUID ENERGY MILLED COLLOIDAL SILICA

Francis R. Sampson, 2320 W. Greenwood, Glendale, Wis. 54437. and Richard F. Heitmiller, 2520 York Road, Raleigh, N.C. 27608

No Drawing. Continuation-in-part of application Ser. No. 483,779, Aug. 30, 1965. This application Feb. 20, 1968, Ser. No. 706,778

Int. Cl. B01j *13/00;* **C01b** *33/14;* **C10m** *5/02*

U.S. Cl. 252—317 **10 Claims**

The present invention provides a process for improving the (1) thickening and/or (2) thixotropic properties of certain colloidal silicas. Said process broadly comprises fluid energy milling of certain colloidal silicas having BET-N_2 surface areas of less than about 300 $m.^2$/gram. The thusly treated silicas are found to be useful in the production of greases and sag resistant gel coatings.

3,574,136

DEWATERING BITUMINOUS FROTH

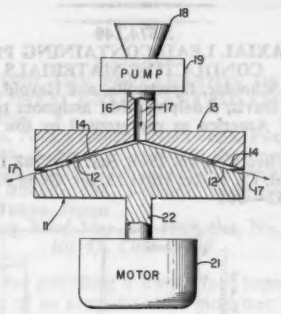
Francis J. Werth, Edmonton, Alberta, Canada, assignor to Cities Service Athabasca, Inc., Imperial Oil Limited, Atlantic Richfield Corporation, and Royalite Oil Company, Limited, fractional part interest to each

Filed June 17, 1968, Ser. No. 737,550

Int. Cl. B01d *17/00*

U.S. Cl. 252—349 **10 Claims**

Bituminous emulsion such as that produced in the hot water process for recovery of bitumen from tar sand is treated for coalescence of water contained in the emulsion by forcing the emulsion between two closely and uniformly spaced surfaces. Shearing forces are thus applied to the emulsion and result in coalescence of water which may subsequently be removed to enable recovery of bitumen of reduced water content. The surfaces between which the emulsion is forced may be parallel or curved concentric surfaces and are preferably spaced between



about ⅛ and about ½ inch apart. Additional shearing force may be applied by movement of at least one of the surfaces in a direction transverse to the direction of flow of the emulsion between the surfaces.

3,574,137

MULTIPLE-ANALYSIS HEMATOLOGY CONTROL COMPRISING HUMAN RED BLOOD CELLS AND FOWL RED BLOOD CELLS IN AN ANTICOAGULANT CONTAINING HUMAN SEROLOGICALLY COMPATIBLE PLASMA MEDIUM

Anthony J. Decasperis, Elmhurst, N.Y., assignor to Pfizer Inc., New York, N.Y.

No Drawing. Filed Feb. 25, 1969, Ser. No. 802,263

Int. Cl. G01n *33/16*

U.S. Cl. 252—408 **9 Claims**

A diagnostic composition serving as a multiple-analysis hematology reference control for red blood cell and white blood cell counting, hemoglobin content and hematocrit determination.

3,574,138

CATALYSTS

Karl Ziegler, Kaiser-Wilhelm-Platz 1, Mulheim (Ruhr), Germany, and Heinz Breil, Erhard Holzkamp, and Heinz Martin, Mulheim (Ruhr), Germany; said Breil, Holzkamp and Martin assignors to said Zeigler

Continuation of applications Ser. No. 469,059, Nov. 15, 1954, now Patent No. 3,257,332, Ser. No. 527,413, Aug. 9, 1955, now abandoned, and Ser. No. 554,631, Dec. 22, 1955, now abandoned. This application Nov. 26, 1957, Ser. No. 692,020

Claims priority, application Germany, Nov. 17, 1953, Z 3,799; Dec. 15, 1953, Z 3,862; Dec. 23, 1953, Z 3,882; June 10, 1954, Z 4,375; Dec. 27, 1954, Z 4,629

Int. Cl. B01j

U.S. Cl. 252—429 **23 Claims**

Catalyst for polymerizing olefins such as ethylene and its homologues in the form of the product obtained upon mixing an aluminum triaryl or aralkyl with a salt, freshly precipitated oxide or hydroxide of a metal of Group IV–B, V–B or VI–B of the Periodic System, including thorium or uranium. Preferable salts are halides, such as titanium chloride or zirconium chloride.

3,574,139

ORGANOALUMINUM HALIDE-COBALT/BIS-PHOSPHINE COMPLEX CATALYSTS

Robert Junior Harder, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Sept. 12, 1966, Ser. No. 578,477

Int. Cl. C07c *11/12*

U.S. Cl. 252—431 **1 Claim**

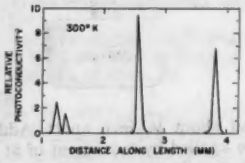
Cis-1,4-hexadiene is prepared by reacting ethylene with butadiene in the presence of a catalyst prepared by mix-

ing bis[ethylenebis(diphenylphosphine)]cobalt (0) or bis [ethylenebis(diphenylphosphine)]cobalt (I) hydride with isobutylalauminum dichloride.

3,574,140
EPITAXIAL LEAD-CONTAINING PHOTOCONDUCTIVE MATERIALS

Richard B. Schoolar, Hyattsville, and Harold R. Riedl and John L. Davis, Adelphi, Md., assignors to the United States of America as represented by the Secretary of the Navy

Filed Feb. 26, 1968, Ser. No. 708,163
Int. Cl. H01c; H01l *13/00*; G03g *5/02*
U.S. Cl. 252—501 **8 Claims**

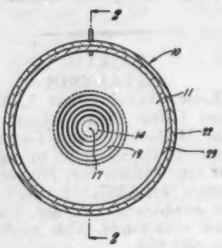


A photo-conductive material is formed by taking an epitaxial film of a lead salt or tin lead salt alloy and heating the film in the presence of a gaseous doping agent. The resulting product exhibits photo-sensitive junctions formed along crystallographic defect lines.

3,574,141
CATHODE

Jean Berchtold, Pasadena, Calif., assignor to Bell & Howell Company, Chicago, Ill.

Original application Sept. 10, 1965, Ser. No. 487,652, now Patent No. 3,500,106, dated Mar. 10, 1970. Divided and this application Oct. 2, 1969, Ser. No. 870,716
Int. Cl. H01b *1/02*; C01f *1/00*
U.S. Cl. 252—512 **4 Claims**



A composition having electron emission properties when compacted and subjected to a heating current, comprising thoria as a first metal oxide, rhenium, and a small amount of refractory second metal oxide.

3,574,142
CERAMIC MATERIAL FOR MAGNETOHYDRODYNAMIC GENERATOR ELECTRODE

David Yerouchalmi, Le Mesnil-St.-Denis, France, assignor to Commissariat a l'Energie Atomique, Paris, France

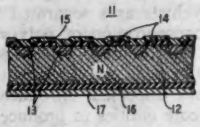
No Drawing. Filed Jan. 24, 1969, Ser. No. 793,906
Claims priority, application France, Jan. 24, 1968, 137,310
Int. Cl. H01b *1/06*; G21d *7/02*
U.S. Cl. 252—520 **6 Claims**

Conductive ceramic material which is intended for the fabrication of MHD generator electrodes and affords resistance to the corrosive action of the alkaline seed is the gas which passes through the generator duct. Said ceramic material consists mainly of an alkaline-earth zirconate containing an additive which is selected from chromium oxide and alumina.

3,574,143
RESISTIVE COMPOSITION OF MATTER AND DEVICE UTILIZING SAME

Frederick Vratny, Berkeley Heights, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill and Berkeley Heights, N.J.

Filed Feb. 19, 1969, Ser. No. 800,536
Int. Cl. H01b *1/06*
U.S. Cl. 252—520 **6 Claims**



A novel resistive composition of matter of the general formula $(M,Hf)N_{2-x}$ wherein M is selected from the group consisting of tantalum and titanium and x ranges from 0.0–0.5 is obtained by reactive sputtering of metal cathodes in the presence of nitrogen at pressures ranging from 10–150 microns.

3,574,144
CERAMIC COMPONENT FOR MAGNETOHYDRODYNAMIC GENERATOR ELECTRODE

David Yerouchalmi, Le Mesnil-St.-Denis, France, assignor to Commissariat a l'Energie Atomique, Paris, France

No Drawing. Filed Jan. 24, 1969, Ser. No. 793,907
Claims priority, application France, Jan. 24, 1968, 137,311
Int. Cl. H01b *1/06*; G21d *7/02*
U.S. Cl. 252—521 **2 Claims**

A ceramic component which is intended for use in the fabrication of MHD generator electrodes and has high-temperature strength as well as high resistance to the corrosive action of the seed in the feed gas. The component mainly contains at least one of the magnesium spinels $MgO—Cr_2O_3$ and $MgO—Al_2O_3$ to which is added an alkaline-earth oxide CaO, BaO or SrO in a proportion within the range of 1 to 10 mole percent.

3,574,145
ION-EXCHANGE RESINS FROM KETONE-DIALDEHYDE CONDENSATES

Jean-Pierre Quentin, Lyon, and Michel Ruaud, Rhone, France, assignors to Rhone-Poulenc S.A., Paris, France

No Drawing. Filed Mar. 18, 1969, Ser. No. 808,315
Claims priority, application France, Mar. 19, 1968, 144,422
Int. Cl. C08g *3/00*
U.S. Cl. 260—2.1 **2 Claims**

Ion-exchange resins are made by introducing ion-exchange groups into polycondensates made by reaction of a dialdehyde with a ketone.

3,574,146
PROCESS FOR THE PRODUCTION OF POLYAMIDE FOAMS

Hermann Schnell, Krefeld-Urdingen, Kurt Schneider, Krefeld-Bockum, and Heinrich Gilch, Krefeld-Urdingen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 15, 1967, Ser. No. 690,833
Claims priority, application Germany, Dec. 17, 1966, F 50,985
Int. Cl. C08f *47/08*; C08j *1/14, 1/20*
U.S. Cl. 260—2.5 **4 Claims**

A process for the continuous production of a polyamide foam by introducing (1) a mixture of a lactam and an alkaline catalyst e.g. sodium borohydride, and (2) a

mixture of a lactam and an activator, e.g. hexamethylene diisocyanate, in a mixing chamber. Preferably, heating is accomplished in the mixing chamber by heat exchange wherein mixture (1) is introduced just above the lactam melting point and mixture (2) is above the reaction temperature. The combined mixtures are introduced into a heated mold for polymerization and foaming.

3,574,147
GASKET COMPOSITION
Donald A. Giessler and Floyd Arthur Ratliff, Muncie, Ind., assignors to Ball Corporation, Muncie, Ind.
No Drawing. Continuation of application Ser. No. 378,955, June 29, 1964. This application June 11, 1968, Ser. No. 751,642
Int. Cl. C08f *47/10*; C08g *53/10*
U.S. Cl. 260—2.5 12 Claims

Home canning lid having as the sealing portion thereof a cellular plastisol gasket formed from a vinyl polymer, a phenol-formaldehyde resin, a filler, at least one plasticizer, and a blowing agent, and said gasket composition which is capable of withstanding the pressures, temperatures, and abrasion inflicted upon a home canning lid.

3,574,148
CELLULAR POLYURETHANE PLASTICS
Erwin Windemuth and Gerhard Grogler, Leverkusen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany
No Drawing. Filed Mar. 4, 1969, Ser. No. 804,301
Claims priority, application Germany, Mar. 7, 1968, P 16 94 250.0
Int. Cl. C08g *22/00, 51/58*
U.S. Cl. 260—2.5 2 Claims

Cellular polyurethane plastics having improved flame resistance which contain an open chain or cyclic organic ester of an acid of hexavalent sulphur and a bromide or iodide of an alkali metal or an alkaline earth metal, lithium chloride, calcium chloride or magnesium chloride wherein the organic ester contains no hydrogen atoms which are reactive with NCO groups.

3,574,149
FLAME RETARDANT FLEXIBLE POLYURETHANE FOAMS
John T. Harrington, Akron, Ohio, assignor to The General Tire & Rubber Company, Akron, Ohio
No Drawing. Filed May 13, 1969, Ser. No. 824,285
Int. Cl. C08g *22/44*
U.S. Cl. 260—2.5 7 Claims

Low density, flexible and semiflexible polyetherurethane foams containing halogen-containing polymers such as polyvinyl chloride are rendered resistant to flame to the point of being self-extinguishing by the use of a minor amount of a mixture of zinc oxide (French process) and antimony oxide.

3,574,150
OPEN-PORE POLYURETHANE PRODUCT
Robert T. Jefferson, West Carrollton, and Ival O. Salyer, Dayton, Ohio, assignors to the United States of America as represented by the United States Atomic Energy Commission
Continuation-in-part of abandoned application Ser. No. 586,923, Oct. 17, 1966. This application May 28, 1969, Ser. No. 828,647
Int. Cl. C08g *22/44, 22/12*
U.S. Cl. 260—2.5 8 Claims

An open-port polyurethane structure having a porosity of at least 50% and a density of 0.1–0.5 gram per cubic centimeter, and comprising coherent spherical particles of less than 10 microns diameter separated by interconnected interstices useful as a filter and oil-absorbent; and the method of producing said structure.

3,574,151
PROCESS FOR THE PREPARATION OF TRANSPARENT IMPACT-RESISTANT POLYMER COMPOSITIONS
Takeshi Goto, Nikko Danchi, Nikko-cho, Fuchu-shi; Eiji Sakaoka, 48, 2-chome, Seki-machi, Nerima-ku; Michikazu Hiraoka, 261 Hyakunin-cho, Shinjuku-ku; and Shonosuke Rokudo, 588, 3-chome, Nerimune Suginami-ku, all of Tokyo, Japan
No Drawing. Filed Mar. 26, 1968, Ser. No. 715,976
Int. Cl. C08f *19/08*
U.S. Cl. 260—4 23 Claims

A method for providing a transparent impact-resistant graft polymer of an aromatic vinyl monomer and a rubbery polymer backbone whereby graft polymerization is conducted in the presence of a minor amount of β-bromostyrene and a transparent impact-resistant graft polymer resulting therefrom.

3,574,152
PLASTIC MATERIALS COMPRISING TEA EXTRACTS RESIDUE AS FILLER
Eugenie Ligo, 38 Calcraft House, Bonner Road, London, England
No Drawing. Filed Aug. 13, 1969, Ser. No. 849,873
Claims priority, application Great Britain, Aug. 14, 1968, 38,935/68
Int. Cl. C08g *51/14*
U.S. Cl. 260—6 14 Claims

Plastic materials comprise as filler the material tea flour which is the residue obtained after extraction of solubles from tea leaves and stalks reduced to dried powdered form.

3,574,153
WATER REMOISTENABLE HOT MELT ADHESIVE COMPOSITIONS COMPRISING MIXTURES OF WATER SOLUBLE POLYMERS WITH ACID HYDROLYZED POLYVINYL ACETATE
Julius Sirota, South Plainfield, N.J., assignor to National Starch and Chemical Corporation, New York, N.Y.
Filed July 6, 1967, Ser. No. 651,438
Int. Cl. C08f *29/30*; C08g *49/00*; C09j *3/06, 3/16*
U.S. Cl. 260—8 10 Claims

Remoistenable hot melt adhesive compositions comprising a mixture of a water soluble polymeric species with a polyvinyl acetate which has been hydrolyzed by means of an acidic hydrolysis technique to the extent that from about 10 to 60% of its original number of acetate groups are converted into hydroxyl groups. Flexible web substrates coated on at least one surface, or part thereof, with said remoistenable hot melt adhesive compositions. These adhesive compositions are ideally suited for use in the manufacture of envelopes, stamps, gummed tapes and wallpaper, etc.

3,574,154
CELLULOSE ACETATE BUTYRATE COATING COMPOSITIONS AND COATED PRODUCTS
Robert S. Shaw, Huntingdon Valley, Bayard V. Tirrill, Warminster, and John L. Gardon, Cheltenham, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.
No Drawing. Filed July 11, 1968, Ser. No. 743,968
Int. Cl. C08b *21/08*; C08g *41/00*; C08h *15/00*; C09d *3/48*
U.S. Cl. 260—16 5 Claims

The present invention is concerned with improved coating compositions based on cellulose acetate butyrate plasticized with diisocyanate-extended polyesters having a mo-

lecular weight of at least 8000. The invention also includes flexible products, such as substitute leather having topcoatings thereon of outstanding flexibility made from these compositions.

3,574,155
WOOD FILLER COMPOSITION

Thomas G. Parker, Fisher Lake, Three Rivers, Mich., assignor to U.S. Plywood-Champion Papers Inc., New York, N.Y.

Filed June 17, 1968, Ser. No. 737,710
Int. Cl. C08f 45/52
U.S. Cl. 260—23 13 Claims

The present invention is concerned with a plastic filler composition for fibrous or wood products for use in the building materials and construction industries, particularly for use when face nailing wooden elements such as plywood panels and boards wherein the nails are countersunk. The filler is composed of tall-oil fatty acid ester, waxes, polyethylene, pigment, talc, and optionally, an antioxidant.

3,574,156
ANTISTATIC RESINOUS COMPOSITIONS

John Duncan Wagner, Chester, England, and Hans-Werner Friedrich Michael Finck, Wedel-Holstein, Germany, assignors to Lever Brothers Company, New York, N.Y.

No Drawing. Filed May 28, 1969, Ser. No. 830,217
Claims priority, application Great Britain, May 31, 1968, 26,130/68
Int. Cl. C08f 45/00
U.S. Cl. 260—23 4 Claims

The invention relates to the use of fatty acid glycerides containing at least 50% by weight, preferably at least 80% by weight of a saturated linear C_6–C_{10} monoglyceride for reducing the surface electrical resistance of thermoplastic polymers such as polyethylene, polypropylene, polyvinylchloride and polystyrene. Resinous compositions possessing improved antistatic properties and comprising 0.05–7% by weight C_6–C_{10} monoglyceride and processes for preparing these compositions are provided.

3,574,157
COATING COMPOSITION OF EPOXY RESINS, POLYESTER RESINS, AND VINYL MONOMERS

Fred Markus, 4343 Finley Ave., Los Angeles, Calif. 90027

No Drawing. Filed Feb. 3, 1969, Ser. No. 796,223
Int. Cl. C08f 45/52
U.S. Cl. 260—28.5 9 Claims

An improved liquid stable resinous coating composition polymerized by an epoxy converter to a solid durable coating having controlled flexibility is provided. The composition comprises liquid epoxy resin curable at ambient temperature with a converter such as an amine and a specified volume concentration of a liquid unsaturated polyester at least essentially free of triglyceride oil and fatty acid and comprising the reaction product of polybasic acid and polyhydric alcohol, at least one of the acid and alcohol being unsaturated, in a concentration sufficient to increase the flexibility of the composition, and a promoter for the polyester. Composition is, in part, characterized by being free of a catalyst for the polyester and at least essentially free of volatile solvent. The composition is capable of being spread as a coating on a surface and cured at ambient temperature to a durable solid surface having controlled flexibility by adding the epoxy converter to the liquid composition before coating. Prior to such addition the composition can be maintained over a considerable period of time without thickening. The invention also includes a method of coating utilizing the composition.

3,574,158
DYEABLE ACRYLONITRILE POLYMER COMPOSITIONS

Denis Coleman, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

No Drawing. Continuation-in-part of application Ser. No. 692,677, Dec. 22, 1967. This application Apr. 10, 1968, Ser. No. 720,329
Int. Cl. C08f 15/00, 45/24, 37/18
U.S. Cl. 260—29.6 17 Claims

A copolymer of about 65 to 92 mole percent acrylonitrile and about 8 to 35 mole percent of a salt of the formula:

$$[CH_2{=}C(R_1){-}C(=O){-}O{-}R_2{-}\overset{+}{N}R_3R_4R_5].CNS^-$$

wherein R_1 is selected from the group consisting of hydrogen and methyl, R_2 is selected from the group consisting of alkylene and hydroxyalkylene of two to four carbon atoms and $-CH_2CH_2OCH_2CH_2-$, and R_3, R_4 and R_5 are each lower alkyl of between 1 and 3 carbon atoms. The copolymer is obtained by copolymerizing in an aqueous medium acrylonitrile and a quaternary ammonium salt of the formula:

$$[CH_2{=}C(R_1){-}C(=O){-}O{-}R_2{-}\overset{+}{N}R_3R_4R_5].X^-$$

wherein R_1, R_2, R_3, R_4 and R_5 are defined above and X is a water soluble anion. The copolymer is precipitated from the aqueous medium with a water-soluble thiocyanate compound. These copolymers are useful in the production of acid dyeable or modified basic dyeable acrylonitrile shaped articles when blended with acrylonitrile polymers containing more than 70 weight percent acrylonitrile.

3,574,159
POLYMERIC LATICES

Edward Joseph Fetter, Springdale, and Frederick Lyle Andrew, Norwalk, Conn., assignors to American Cyanamid Company, Stamford, Conn.

No Drawing. Filed Dec. 22, 1967, Ser. No. 692,721
Int. Cl. C08d 1/09, 7/18
U.S. Cl. 260—29.7 10 Claims

Synthetic latex compositions comprising a polymer of a styrene monomer, a conjugated diolefin and an unsaturated acid or amide and from about 0.5 to about 10.0%, by weight, of various cyclohexyl sulfosuccinates, are disclosed.

3,574,160
PROCESSING AIDS

Nelson Nae-Ching Hsu, Stamford, Conn., assignor to American Cyanamid Company, Stamford, Conn.

No Drawing. Filed Dec. 7, 1967, Ser. No. 688,675
Int. Cl. C08f 45/44
U.S. Cl. 260—30.4 4 Claims

Compositions comprising difficultly processable thermoplastic resins containing various furfuryl and picoline materials as processing aids and a process for the production thereof are disclosed. These resins are the polyimides, the polysulfones, the polyphenylene oxides, and the polycarbonates.

3,574,161
MANUFACTURE OF POLYMERIC COMPOSITIONS

Robert P. Campion, Walsall, and James F. Yardley, Little Aston, near Sutton Coldfield, England, assignors to The Dunlop Company Limited, London, England

No Drawing. Filed Feb. 28, 1968, Ser. No. 708,764
Claims priority, application Great Britain, Mar. 28, 1967, 10,411/67
Int. Cl. C08f 47/20
U.S. Cl. 260—34.2 9 Claims

Method of preparing a solution of a polymeric material in an organic solvent which comprises mixing (A)

a dispersion of polymeric particles in water, in which the particles are dispersed with the assistance of an ionic dispersing agent, with (B) a dispersion of the organic solvent in water, in which the solvent has been dispersed using a high degree of shear with the assistance of a dispersing agent of opposite polarity to the first-mentioned dispersing agent, and separating the water layer thus formed from the organic solvent layer containing the polymeric material.

3,574,162
STABILISING MALEIC ANHYDRIDE COPOLYMERS

Dennis Arthur Barr, Welwyn, England, assignor to Imperial Chemical Industries Limited, London, England

No Drawing. Continuation-in-part of application Ser. No. 368,330, May 18, 1964. This application Sept. 18, 1968, Ser. No. 760,662

Int. Cl. C08f *45/58*

U.S. Cl. 260—45.7 **6 Claims**

Copolymers of maleic anhydride and 2-substituted propenes as claimed in U.S. Pats. 3,297,654 and 3,318,851 are heat-stabilised during moulding processes by the incorporation of non-volatile organic sulphonic acids or their esters, organic base salts, anhydrides and acid halides which will decompose to yield the organic sulphonic acid when heated during fabrication into shaped articles.

3,574,163
POLYOLEFINS STABILIZED WITH AMINE SALTS OF PHOSPHINODITHIOIC ACIDS

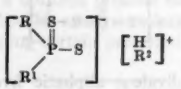
Stanley B. Mirviss, Stamford, Conn., and Melvin M. Schlechter, New Hyde Park, N.Y., assignors to Stauffer Chemical Company, New York, N.Y.

No Drawing. Original application Jan. 3, 1966, Ser. No. 517,950. Divided and this application Dec. 5, 1967, Ser. No. 708,459

Int. Cl. C08f *45/60*

U.S. Cl. 260—45.8 **4 Claims**

Poly-α-olefin compositions having improved light stability. The compositions comprise an α-olefin polymer formed by the polymerization of an α-mono-olefinic aliphatic hydrocarbon having from 2 to 10 carbon atoms and a stabilizing quantity of a novel organophosphorus amine salt of the formula:



wherein R and R^1 are selected from the group consisting of alkyl, alkoxy, aryl, aryloxy and aralkyl; and R^2 is an amine selected from the group consisting of secondary and tertiary heterocyclic amines.

3,574,164
FLAME RETARDANT COMPOSITIONS

Henryk A. Cyba, Evanston, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Dec. 12, 1968, Ser. No. 783,439

Int. Cl. C08c *27/70*; C08f *45/62*; C08g *51/62*; C08d *11/04*

U.S. Cl. 260—45.75 **24 Claims**

Novel compositions of matter comprise (1) a compound containing at least one reactive functional substituent and (2) a salt of a phosphorus compound and the reaction product formed from a polyhalopolyhydropolycyclicdicarboxylic acid, anhydride or ester with an alkanolamine containing a hydroxyl and an amino group. The compounds are exemplified by a composition of matter comprising polypropylene and a salt prepared by reacting 5,6,7,8,9,9 - hexachloro - 1,2,3,4,4a,5,8,8a - octahydro - 5,8 - methano - 2,3 - naphthalenedicarboxylic anhydride with N,N-diethyl ethanolamine and then reacting the resultant reaction product with mixed mono- and di-tridecyl acid ortho-phosphate. These compositions of matter are useful where a high degree of resistance to flame is a required characteristic of the product.

3,574,165
STABILIZING OF ORGANIC MATERIALS

Harry Braus, Springdale, and Jay R. Woltermann, Cincinnati, Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

No Drawing. Original application Nov. 22, 1967, Ser. No. 684,962, now Patent No. 3,509,220, dated Apr. 28, 1970. Divided and this application Aug. 27, 1969, Ser. No. 870,729

Int. Cl. C08f *45/58*

U.S. Cl. 260—45.95 **2 Claims**

2,9-bis(3,5-di-t-butyl-4 - hydroxybenzylthio) - p - menthane can be used to stabilize organic materials.

3,574,166
HIGH MOLECULAR WEIGHT POLYQUINAZOLONES

Eduard Radlmann, Gunter Lorenz, and Manfred Gallus, Dormagen, Jurgen Schramm, Solingen-Ohligs, and Gunther Nischk, Dormagen, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed June 16, 1969, Ser. No. 833,779

Claims priority, application Germany, June 26, 1968, P 17 70 707.2

Int. Cl. C08g *33/02*

U.S. Cl. 260—49 **2 Claims**

High molecular weight polyquinazolones and a process for their production by polycondensation of a mixture of polymerhomologous primary aromatic diamines containing ether groups with dibenzoxazinones at temperatures of from 80 to 250° C.

3,574,167
NITROGENOUS POLYESTER-ETHER POLYOLS AND POLYURETHANES PREPARED THEREFROM

Leslie Catron Case and Laura Kaiser Case, both of 14 Lockeland Road, Winchester, Mass. 01890

No Drawing. Continuation-in-part of application Ser. No. 803,975, Mar. 3, 1969, which is a division of application Ser. No. 532,116, Mar. 7, 1966, now Patent No. 3,454,530, which is a continuation-in-part of applications Ser. No. 168,062, Jan. 23, 1962, Ser. No. 188,842, Apr. 19, 1962, Ser. No. 456,816, May 18, 1965, Ser. No. 485,932, Sept. 8, 1965, Ser. No. 611,826, Jan. 26, 1967, now Patent No. 3,502,601, and Ser. No. 665,005, Aug. 21, 1967, now Patent No. 3,483,169. This application May 19, 1969, Ser. No. 825,997

Int. Cl. C08g *22/06, 22/08*

U.S. Cl. 260—75 **24 Claims**

Novel polyurethane compositions which are derived from novel nitrogenous polyester-ether polyols are described. These polyols are prepared by coreacting aminoalcohols, optionally aliphatic polyalcohols, cyclic anhydrides of alicyclic and/or aromatic polycarboxylic acids, and epoxides or oxetanes.

3,574,168
PROCESS FOR REDUCING OXIDATION OF POLYCARBONAMIDE PELLETS

Wayne H. Martin, Vienna, W. Va., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Dec. 29, 1967, Ser. No. 694,409

Int. Cl. C08g *20/38*

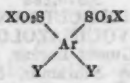
U.S. Cl. 260—78 **5 Claims**

Packaging of polyamide molding pellets wherein the polyamide is blanketed with an inert gas preferably from

the time of extrusion and particularly during drying until packaging and wherein the voids surrounding the pellets in the packaged polyamide are filled with an inert gas rather than an air atmosphere to avoid loss of color stability.

3,574,169
ARYLENE SULFIMIDE POLYMERS
Gaetano F. D'Alelio, South Bend, Ind., assignor to the United States of America as represented by the Secretary of the Air Force
No Drawing. Continuation-in-part of application Ser. No. 668,254, Sept. 15, 1967. This application Dec. 3, 1969, Ser. No. 881,919
Int. Cl. C08g *20/00*
U.S. Cl. 260—78 **9 Claims**

New polymers of improved resistance to high temperatures comprising polyarylene polysulfimides prepared by the condensation of tetrafunctional aromatic polysulfonic compounds of the formula



with polyamines of the formula $H_2N—Ar'—NH_2$ wherein Ar and Ar' represent polyvalent aromatic nuclei; the SO_2X groups are each paired with a Y radical in an ortho or peri position; Y represents —COX or $—SO_2X$; X is OR, Cl, Br, or two X's of adjacent functional groups can together represent —O— or —NR—; and R is hydrogen or a hydrocarbon radical of no more than 20 carbon atoms. The polymers of this invention may be used for preparing laminates, adhesives, fibers and molding compositions particularly for use at high temperatures such as in aerospace flight.

3,574,170
PROCESS FOR THE PRODUCTION OF BBB TYPE POLYMER
Edward C. Chenevey, North Plainfield, N.J., assignor to Celanese Corporation, New York, N.Y.
No Drawing. Filed Oct. 20, 1969, Ser. No. 867,878
Int. Cl. C08g *20/32, 33/02*
U.S. Cl. 260—78.4 **11 Claims**

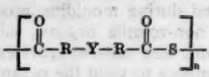
An improved process is provided for the formation of BBB type polymer, i.e. poly(bisbenzimidazobenzophenanthroline) and related nitrogenous polymers. The condensation reaction of at least one organic tetraamine and at least one tetracarboxylic acid (which may optionally be in the form of the corresponding dianhydride) is conducted in a phosphoric acid polymerization medium having an H_3PO_4 concentration of about 50 to 110 percent by weight. In a preferred embodiment of the invention the phosphoric acid is present in an H_3PO_4 concentration of about 104 to 109 percent by weight, e.g. superphosphoric acid having an H_3PO_4 concentration of about 105 percent by weight.

3,574,171
PROCESS FOR PRODUCING IMPROVED BBB TYPE POLYMER
Edward C. Chenevey, North Plainfield, and Rufus S. Jones, Jr., Morristown, N.J., assignors to Celanese Corporation, New York, N.Y.
No Drawing. Filed Oct. 20, 1969, Ser. No. 867,879
Int. Cl. C08g *20/32, 20/38, 33/02*
U.S. Cl. 260—78.4 **22 Claims**

A process is provided for producing an improved BBB type polymer, i.e. poly(bisbenzimidazobenzophenanthroline) and related nitrogenous polymers. The improved BBB type polymer is essentially free of unstable linkages and is formed by slurrying bulk polymer while in particulate form in a dilute aqueous solution of an alkaline compound selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide, ammonia, and mixtures of the foregoing. The polymer formed in the present process is particularly suited for the formation of thermally stable shaped articles, e.g. fibers or films, exhibiting improved tensile properties.

3,574,172
POLY(ALKYLETHER THIOL ANHYDRIDES)
Walter Stamm, Tarrytown, N.Y., assignor to Stauffer Chemical Company, New York, N.Y.
No Drawing. Filed Sept. 18, 1968, Ser. No. 760,679
Int. Cl. C08g *25/00*
U.S. Cl. 260—79 **5 Claims**

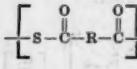
Novel poly(alkylether thiol anhydrides) are provided having the formula:



wherein R is a divalent aliphatic hydrocarbon radical consisting essentially of hydrogen and carbon, Y is sulfur or oxygen and *n* is an integer representing the number of repeating units. Polymer compositions are also provided comprising vinyl type polymers containing the novel thio anhydride compositions of this invention as stabilizers therefor.

3,574,173
POLY(THIOL ANHYDRIDES)
Walter Stamm, Tarrytown, N.Y., assignor to Stauffer Chemical Company, New York, N.Y.
No Drawing. Filed Sept. 18, 1968, Ser. No. 760,699
Int. Cl. C08g *25/00*
U.S. Cl. 260—79 **5 Claims**

Novel poly(thiol anhydrides) are provided having the formula:



wherein R is a divalent aliphatic hydrocarbon radical consisting essentially of hydrogen and carbon and *n* is an integer representing the number of repeating units. Polymer compositions are also provided comprising vinyl type polymers containing the novel thio anhydride compositions of this invention as stabilizers therefor.

3,574,174
POLYMERIZATION PROCESSES IN THE PRESENCE OF CATALYST COMPOSITIONS COMPRISING (1) REACTION PRODUCT OF A VANADIUM OXIDE AND ORGANIC PHOSPHORUS COMPOUND, (2) A HYDROCARBYL SILANE AND A HALO-ALUMINUM COMPOUND
John W. Bayer, Perrysburg, and Donald W. Gagnon and William C. Grinonneau, Toledo, Ohio, assignors to Owens-Illinois, Inc.
No Drawing. Continuation-in-part of application Ser. No. 465,210, June 18, 1965. This application Aug. 6, 1968, Ser. No. 750,492
Int. Cl. C08f *3/04, 3/30, 3/76*
U.S. Cl. 260—88.7 **10 Claims**

Disclosed herein is a catalyst composition, a method for making it, and a method of polymerization of un-

saturated compounds; the catalyst composition contains a primary component (produced by the reaction of a vanadium oxide with an organic phosphorus oxy compound) which is employed in conjunction with an organo-aluminum compound as a cocatalyst.

3,574,175

PREPARATION OF WATER SOLUBLE ACRYLIC COPOLYMERS FOR USE IN WATER TREATMENT

Dudley G. Woodard, Columbia City, Md., assignor to W. R. Grace & Co., New York, N.Y.

No Drawing. Filed May 22, 1969, Ser. No. 827,057
Int. Cl. C08f *15/02*
U.S. Cl. 260—80.3 14 Claims

This invention relates to the preparation of copolymers of hydrochlorides of N,N-diallylglycinonitrile, N,N-diallylglycinamide and N,N-diallylglycine with acrylic acid and acrylamide. These copolymers are useful in water treatment as scale formation inhibiting agents.

3,574,176

INTERPOLYMERIZATION OF A MIXTURE OF MONOOLEFINS AND A POLYENE IN THE PRESENCE OF CERTAIN BASES

Charles E. Boozer, Baton Rouge, La., assignor to Copolymer Rubber & Chemical Corporation

No Drawing. Continuation-in-part of application Ser. No. 571,168, Aug. 9, 1966, which is a continuation-in-part of application Ser. No. 551,513, May 20, 1966. This application Apr. 20, 1967, Ser. No. 632,168
Int. Cl. C08f *15/40*
U.S. Cl. 260—80.78 18 Claims

Sulfur vulcanizable elastomers having improved characteristics are prepared by interpolymerizing a monomeric mixture containing ethylene, at least one alpha-monoolefin containing 3–16 carbon atoms, and at least one polyene in a hydrocarbon polymerization solvent, and in the presence of a Ziegler catalyst and certain bases such as ammonia, aniline and pyridine. The elastomers are soluble in the hydrocarbon solvent, and are free of deleterious gel or crosslinking and other undesirable forms of polymerization. The properties of the elastomer are reproducible and a uniform product may be produced on a continuous basis. The catalyst mileage is also increased markedly when using certain preferred bases.

3,574,177

PRODUCTION OF ACRYLONITRILE POLYMERS

Akira Nakajima, Kenji Takeya, and Yukio Shimosaka, Saidaiji, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

No Drawing. Continuation-in-part of abandoned application Ser. No. 397,652, Sept. 18, 1964. This application May 8, 1968, Ser. No. 727,670
Claims priority, application Japan, Sept. 23, 1963, 38/51,151
Int. Cl. C08f *3/76, 15/22*
U.S. Cl. 260—88.7 11 Claims

The solution polymerization of acrylonitrile polymers and copolymers is facilitated when it is conducted under agitation in the presence of an inert dispersion medium. The solvent used is one that will dissolve both the monomer and the resulting polymer. The dispersion medium is a liquid that is not uniformly miscible with the solvent and it will not dissolve either the monomer or the polymer. Upon permitting the reaction product, a dispersion, to stand quietly it separates into two liquid phases that can be separated by decantation. The preferred dispersion media are liquid hydrocarbons, halogenated or not, that have a boiling point above 268° C.

3,574,178

PRODUCTION OF VINYLIDENE FLUORIDE POLYMERS

Yasushi Toyoda and Nobuo Bannai, Iwaki-shi, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo-to, Japan

No Drawing. Filed Apr. 4, 1968, Ser. No. 718,924
Claims priority, application Japan, Apr. 14, 1967, 42/23,742
Int. Cl. C08f *1/11, 3/22*
U.S. Cl. 260—92.1 3 Claims

Suspension polymerization of vinylidene fluoride monomer is carried with the use of from 0.1 to 200 parts by weight of a water-soluble solvent such as methanol, ethanol, dioxane, or a mixture thereof relative to 100 parts by weight of water, this water-soluble solvent being used as an agent for regulating the degree of polymerization and particle size of the resulting polymer product. In addition, a dialkylperoxydicarbonate and a suspending agent such as a polyvinyl alcohol or a cellulose are used in the polymerization process.

3,574,179

PROCESS FOR THE PRODUCTION OF HIGHLY CRYSTALLINE POLYOLEFINS

Shotaro Sugiura, Harno Ueno, Hideo Ishikawa, and Takefumi Yamao, Ube-shi, and Tuneo Shimamura, Onoda-shi, Japan, assignors to Ube Industries, Ltd., Ube-shi, Japan

No Drawing. Filed Dec. 9, 1968, Ser. No. 782,424
Int. Cl. C08f *1/56, 3/10*
U.S. Cl. 260—93.7 7 Claims

A process for producing crystalline poly(alphaolefins) which comprises polymerizing alpha-olefins by contacting them with a three-component catalyst system obtained from an organoaluminum compound, a titanium halide and a mercaptide of a metal selected from the class consisting of the metals of Groups I*a* and *b*, II*b*, IV*b*, VII*a* and VIII of the Periodic Table of Elements.

3,574,180

PROCESS FOR SEPARATING STARCH AND PROTEIN FROM WHEAT FLOUR WHEREIN THE FLOUR IS AGITATED WITH WATER AND NH_4OH AND CENTRIFUGATION IS APPLIED TO THE RESULTING SLURRY

Philip H. Johnston, San Lorenzo, and David A. Fellers, El Cerrito, Calif., assignors to the United States of America as represented by the Secretary of Agriculture

No Drawing. Filed Apr. 23, 1968, Ser. No. 723,610
Int. Cl. A23j *1/12*
U.S. Cl. 260—112 4 Claims

Procedure for separating the starch and protein components of wheat flour wherein the flour is agitated with water and ammonium hydroxide and centrifugation is applied to the resulting slurry.

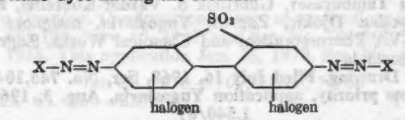
3,574,181

DISAZO DYES

Willy Forter, Allschwil, Basel-land, and Fritz Kehrer, Basel, Switzerland, assignors to Sandoz Ltd. (also known as Sandoz A.G.), Basel, Switzerland

No Drawing. Filed Jan. 18, 1968, Ser. No. 698,690
Int. Cl. C09b *33/02*
U.S. Cl. 260—152 3 Claims

Disazo dyes having the formula



where the two X symbols stand for the radicals of identical or different coupling components which are free from water-solubilizing groups, are useful for the pigmentation or printing of natural and synthetic materials.

3,574,182

CALCIUM SALT OF 6-BROMO-1-(1'-SULFO-2'-NAPHTHYLAZO)-2-NAPHTHOL

Freeman B. Jones, Jr., East Lansing, Mich., assignor to Xerox Corporation, Rochester, N.Y.

Filed Feb. 1, 1967, Ser. No. 613,295
Int. Cl. C09b *29/16, 45/22;* **D06g** *1/10*
U.S. Cl. 260—195 **1 Claim**

Compounds consisting of a group of metal salts of 1(1' - sulfo - 2' - naphthylazo) - 2 - naphthols. The compounds are useful as electrically photosensitive magenta pigment particles in photoelectrophoretic imaging such as shown in U.S. Pat. 3,384,565, issued May 21, 1968, to V. Tulagin and L. Carreira.

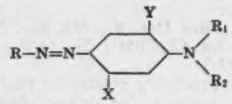
3,574,183

WATER-INSOLUBLE MONOAZO DYESTUFFS

Winfried Kruckenberg, Leverkusen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Feb. 3, 1967, Ser. No. 613,750
Claims priority, application Germany, Feb. 12, 1966, F 48,416
Int. Cl. C09b *29/08;* **D06p** *1/02*
U.S. Cl. 260—207.1 **3 Claims**

Azo dyestuffs useful in dyeing and printing hydrophobic fibrous materials are provided which correspond to the formula



wherein R is a cyclic radical; X is acylamino; Y is hydrogen, halogen, alkyl, or an alkoxy radical; R_1 is an aliphatic ether radical terminated by an alkoxy carboxy radical; and R_2 is either an alkyl radical or an R_1 radical.

3,574,184

PROCESS OF PREPARING A FERRIC HYDROXIDE-DEXTRAN COMPLEX

Ranulph Michael Alsop, Alderley Edge, England, and Ian Bremner, Cults, Scotland, assignors to Fisons Pharmaceuticals Limited, Loughborough, Leicestershire, England

No Drawing. Filed May 7, 1968, Ser. No. 727,343
Claims priority, application Great Britain, May 13, 1967, 22,280/67
Int. Cl. C08b *25/04*
U.S. Cl. 260—209 **7 Claims**

Provided is a process for the preparation of a ferric hydroxide-dextran complex. An aqueous solution of a water-soluble ferric salt is slowly neutralized by the addition of alkali at such a rate that from 10 to 90% of the ferric salt is converted to colloidal ferric hydroxide in not less than 30 minutes. The neutralization is carried out at from 20 to 40° C. An aqueous solution of a dextran is added to the resultant solution and the pH adjusted to 4 to 7. Heating the solution at at least 50° C. effects formation of a stable ferric hydroxide-dextran complex.

3,574,185

ACYL DERIVATIVES OF ERYTHROMYCIN OXIME

Zrinka Tamburasev, Gabrijela S. Vazdar-Kobrehel, and Slobodan Djokic, Zagreb, Yugoslavia, assignors to PLIVA Pharmaceutical and Chemical Works, Zagreb, Yugoslavia

No Drawing. Filed July 16, 1968, Ser. No. 745,104
Claims priority, application Yugoslavia, Aug. 3, 1967, 1,540/67
Int. Cl. C07c *47/18*
U.S. Cl. 260—210 **16 Claims**

Mono- and bis-carboxylic acid acylates of erythromycin oxime, useful as antibiotics.

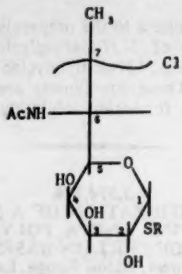
3,574,186

PROCESS FOR MAKING 7-CHLORO-7-DEOXYL-INCOMYCIN AND RELATED COMPOUNDS AND NOVEL INTERMEDIATES PRODUCED THEREIN

Robert D. Birkenmeyer, Comstock Township, Kalamazoo County, and Fred Kagan, Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

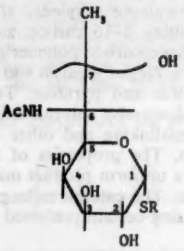
No Drawing. Continuation-in-part of application Ser. No. 696,513, Jan. 9, 1968. This application Oct. 8, 1969, Ser. No. 864,893
Int. Cl. C07c *47/18*
U.S. Cl. 260—210 **22 Claims**

Compounds of the formula:



I

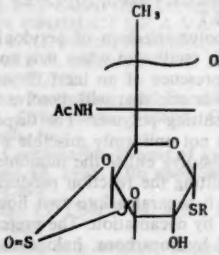
are prepared by replacing by chlorine, the 7-hydroxy of a compound of the formula:



II

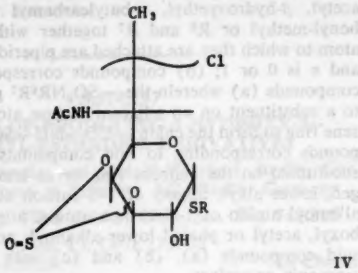
The replacement is effected by (1) mixing the starting compound of Formula II with thionyl chloride, (2) heating with thionyl chloride, and (3) hydrolysis.

Thionyl chloride without heating converts the compounds of Formula II to a 3,4-O-cyclic sulfite of the formula:



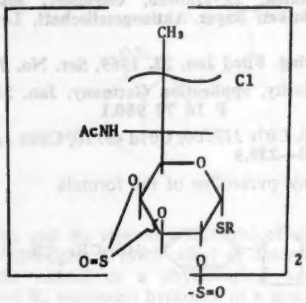
III

Heating with thionyl chloride converts compounds of Formulas II and III to a 3,4-O-cyclic sulfite of the formula:



IV

and a bis-sulfite of the formula:



V

Solvolysis converts compounds of Formulas IV and V to a 7-chloro-7-deoxylincomycin of Formula I.

3,574,187

PROCESS FOR MAKING ALKYL 7-O-ALKYL-1-THIO-α-LINCOSAMINIDES AND PRODUCTS THEREOF

Brian Bannister, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

No Drawing. Filed Nov. 3, 1969, Ser. No. 873,717
Int. Cl. C07c *47/18*
U.S. Cl. 260—210 **4 Claims**

Alkyl 7-O-alkyl-1-thio-α-lincosaminides useful as intermediates for preparing antibacterially active 7-O-alkyllincomycins are prepared by converting 2'-hydroxyethyl 7-O-methyl-1-thio-α-lincosaminide to the corresponding 1-bromo sugar then replacing the bromo group by an alkyl mercapto group while the 2-, 3-, and 4-hydroxyl groups and the 6-amino group are covered by protective groups, and then removing the protective groups; or by acylating an alkyl 6-N,7-O-ethylidyne-3,4-O-isopropylidene-1-thio-α-lincosaminide to form the 2-acylate thereof, hydrolyzing the 6-N,7-O-ethylidyne grouping to form alkyl 2 - O-acyl-6-N-acetyl-3,4-O-isopropylidene-1-thio-α-thiolincosaminide, alkylating the 7-hydroxy group to form alkyl N-acetyl-7-O-alkyl-1-thio-α-lincosaminide, and removing the N-acetyl group by hydrazinolysis and the 3,4-isopropylidene group by hydrolysis to form the desired alkyl 7-O-alkyl-1-thio-α-lincosaminide.

3,574,188

PROCESS FOR PREPARING CARBOXYMETHYL CELLULOSE OR ITS ALKALI SALT OF HIGH VISCOSITY

Kikuo Takehara, Kyoto-shi, Hisakazu Senda, Kuze-gun, and Kazuhiro Hirano, Kyoto-shi, Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd.

No Drawing. Filed Feb. 27, 1970, Ser. No. 15,196
Int. Cl. C08b *11/00*
U.S. Cl. 260—231 **5 Claims**

Cellulose or alkali cellulose is treated with trichloro acetic acid or an alkali salt thereof.

3,574,189

SYNTHETIC PENICILLINS

Kenneth Butler, Waterford, Conn., assignor to Pfizer Inc., New York, N.Y.

No Drawing. Filed Jan. 5, 1968, Ser. No. 695,851
Int. Cl. C07d *99/16*
U.S. Cl. 260—239.1 **3 Claims**

Arylchloro (and bromo) carbonyl ketenes, arylcarboxy ketene esters and aryl carbothiolic phenylesters derived therefrom, methods for their preparation and the use of the esters as acylating agents for the production of esters of α-carboxy- and α-carbothiolic arylacetyl derivatives of 6-aminopenicillanic acid and, by hydrolysis, the corresponding acid derivatives are described.

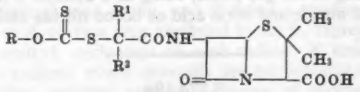
3,574,190

PENICILLIN DERIVATIVES AND THEIR SALTS

Erkki Juhani Honkanen, Timo Kosunen, Joachim Ernst Alberty, and Jaakko Juhani Hukki, Helsinki, Finland, assignors to Laaketehdas Orion Oy, Helsinki, Finland

No Drawing. Filed May 12, 1969, Ser. No. 823,996
Int. Cl. C07d *99/16*
U.S. Cl. 260—239.1 **28 Claims**

Penicillins having the formula



are prepared by reacting 6-aminopenicillanic acid or its salt with a specific reactive derivative of a carbonic acid.

3,574,191

METHOD FOR THE PRODUCTION OF 1,3,4,5-TETRAHYDRO - 1,4-BENZODIAZEPINE DERIVATIVES

Pasquale Domenico Sorrentino, Kastrup, Denmark, assignor to A/S Dumex (Dumex Ltd.), Copenhagen, Denmark

No Drawing. Continuation-in-part of applications Ser. No. 683,106, Nov. 15, 1967, and Ser. No. 709,864, Mar. 4, 1968. This application Jan. 26, 1970, Ser. No. 5,911
Int. Cl. C07d *41/00, 41/06, 53/00*
U.S. Cl. 260—239.3 **1 Claim**

1,3,4,5-tetrahydro - 5 - phenyl - 2H - 1,4-benzodiazepin-2-ones are produced by reacting correspondingly substituted 2-amino-benzhydryl phthalimides with a halogenacetyl halide to transform the amino group into a halogen-

acetylimide group, establishing closure of the diazepine ring by refluxing with an alkali carbonate solution and cleaving off the phthalic acid group with hydrogen bromide in glacial acetic acid solution.

3,574,192

CHLORINATION OF CAPROLACTAM

Yasuo Shibahara, Kyoto, Motoyuki Suzuki, Hirakata, Yoshihiro Hayashi, Kyoto, and Toshiro Fukuda, Otsu, Japan, assignors to Sanyo Chemical Industries, Ltd., Kyoto, Japan

No Drawing. Filed Mar. 12, 1968, Ser. No. 712,390

Claims priority, application Japan, Mar. 30, 1967, 42/20,141

Int. Cl. C07d *41/06*

U.S. Cl. 260—239.3 **4 Claims**

α-Chlorinated derivatives of ε-caprolactam or of N-substituted ε-caprolactam (e.g. N-benzoyl-ε-caprolactam, etc.) are prepared by chlorinating the starting compound with chlorine (gas or solution in organic solvent) in the presence of (a) phosphorus, phosphorus halide, phosphorus oxyhalide, sulfur halide, sulfur oxyhalide, phosphorus thiohalide or complexes thereof with metal halide, and (b) at least one N,N-di-substituted formamide(N,N-di-lower alkyl formamide, N-lower alkyl-N-aralkyl formamide, etc.). The products are useful as intermediates for preparing lysine.

3,574,193

PROCESS FOR THE PRODUCTION OF LACTAMS

Otto Immel, Krefeld-Uerdingen, and Hans-Helmut Schwarz, Krefeld, Germany, assignors to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

No Drawing. Filed Aug. 14, 1969, Ser. No. 850,223

Claims priority, application Germany, Aug. 24, 1968, P 17 95 226.0

Int. Cl. C07d *41/06, 29/42*

U.S. Cl. 260—239.3 **1 Claim**

Process for the production of lactams by catalytic rearrangement of cyclic ketoximes having 5–12 C-atoms in the ring in the gas phase, using as a catalyst a mixture of boron nitride and boric acid or boron nitride and boron trioxide.

3,574,194

1-(α-ETHYL - α - METHYL-SUCCINIMIDO) - 4-SULPHONAMIDOBENZENE AND RELATED COMPOUNDS

Rolf Wilhelm Pfirrmann, Lucerne, Switzerland, assignor to Ed. Geistlich Sohne AG fur Chemische Industrie, Wolhusen, Lucerne, Switzerland

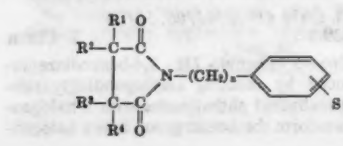
No Drawing. Continuation of application Ser. No. 578,462, Sept. 12, 1966. This application Nov. 26, 1969, Ser. No. 873,741

Claims priority, application Great Britain, Oct. 19, 1965, 44,246/65

Int. Cl. A61k *27/00*; C07d *27/10*

U.S. Cl. 260—239.6 **10 Claims**

A compound is provided selected from (a) compounds of the formula



wherein R^1, R^2, R^3 and R^4 are each hydrogen or alkyl of 1–5 carbon atoms, at least one of R^1, R^2, R^3 and R^4 being alkyl of 1–5 carbon atoms and R^6 and R^7 are each hydrogen, thiazolyl, pyrimidyl, alkyl of 1–5 carbon atoms, acetyl, β-hydroxyethyl, n-butylcarbamyl or ethoxycarbonyl-methyl or R^6 and R^7 together with the nitrogen atom to which they are attached are piperidyl or piperazyl and n is 0 or 1; (b) compounds corresponding to said compounds (a) wherein the $—SO_2NR^6R^7$ group is joined to a substituent on an adjacent carbon atom of the benzene ring to form the chain —CO—NH—SO_2—; (c) compounds corresponding to said compounds (a) and (b) substituted on the benzene ring by at least one of halogen, lower alkyl, alkoxy of 1–5 carbon atoms, hydroxy, alkanoyl amido of 1–5 carbon atoms, nitro, amino, carboxyl, acetyl or phenyl lower alkanoyl; and (d) salts of said compounds (a), (b) and (c) with alkali metals, ammonia or amines.

3,574,195

1,3-DIPHENYL-PYRAZOLINES

Manfred Hajek, Leverkusen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

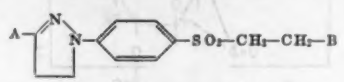
No Drawing. Filed Jan. 22, 1969, Ser. No. 793,183

Claims priority, application Germany, Jan. 31, 1968, P 16 70 980.1

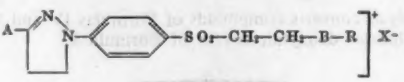
Int. Cl. C07c *117/00*; C07d *49/10*; C09k *1/00*

U.S. Cl. 260—239.9 **2 Claims**

1,3-diphenyl-pyrazoline of the formula



and its quaternization product of the formula



wherein A is a phenyl radical which may be substituted by halogen, alkyl, or alkoxy; B is the radical of a 5-membered nitrogen-containing ring which may be substituted by alkyl, alkoxy, or alkoxy-alkoxy; R is hydrogen, alkyl or aralkyl which may be further substituted by alkyl, alkoxy, or halogen; and X^- is a colorless anion. The compounds of this invention are fluorescent and useful as brightening materials or fibers, filaments, films, and the like.

3,574,196

STEROIDAL 1,4-DIENES

Theodore J. Foell, King of Prussia, Richard W. Rees, Newtown Square, and Herchel Smith, Wayne, Pa., assignors to American Home Products Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 544,800, Apr. 25, 1966. This application Mar. 13, 1967, Ser. No. 622,468

Int. Cl. C07c *169/14, 169/26*

U.S. Cl. 260—239.55 **34 Claims**

Steroids with Δ-1,4 A rings unsubstituted in the 3-position (I) and having adrenocortical, progestational, androgenic and anabolic activity are provided by reducing steroidal Δ-1,4-3-ols (II) or- acylates (III). Compounds (II) are provided by reducing steroidal Δ-1,4-3-ones (IV)

with aluminum hydride in the cold. Compounds (I) also are provided by reducing compounds (IV) with warm aluminum hydride and separating them from 1,3- and 2,4-diene byproducts by selective reduction of the byproducts with lithium in ammonia.

3,574,197

PROCESS OF PRODUCING 1-HYDROXY-7α-METHYL-ESTRADIOL DERIVATIVES

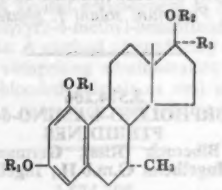
Klaus Prezewowsky and Rudolf Wiechert, Berlin, Germany, assignors to Schering AG, Berlin, Germany

No Drawing. Filed July 9, 1968, Ser. No. 743,315

Int. Cl. C07c *173/00*

U.S. Cl. 260—239.55 18 Claims

1-hydroxy-17α-methyl-estradiol derivatives of the general formula



wherein R_1 and R_2 represent identical or different and designate hydrogen, a lower alkyl or saturated oxygen-heterocyclic radical or a physiological harmless acid radical, and R_3 represents hydrogen or a saturated or unsaturated lower alkyl radical, characterized in that as known in a manner in itself in 1-hydroxy-7α-methyl estrone, whose hydroxy groups may alternatively be present in esterified or etherified form, hydrogen or a saturated or unsaturated, possibly halogenated hydrocarbon is added to the 17-positioned keto groups, and subsequently free esterified or etherified hydroxy groups are hydrolytically divided, esterified or etherified, depending on the ultimately desired significance of R_1 and R_2, are produced such as by the addition of hydrogen to the 17-positioned carbonyl group in the D ring by hydration in the presence of a catalyst.

3,574,198

(ANDROST-17β-YL)-α-PYRONES AND PROCESS FOR THEIR MANUFACTURE

Kurt Radscheit, Kelkheim, Taunus, Ulrich Stache, Hofheim, Taunus, Werner Fritsch, Neuenhain, Taunus, and Werner Haede, Hofheim, Taunus, Germany, assignors to Farbwerke Hoechst Aktiengesellschaft vormals Meister Lucius & Bruning, Frankfurt am Main, Germany

No Drawing. Filed June 11, 1968, Ser. No. 735,964

Claims priority, application Germany, June 16, 1967, F 52,707; Aug. 25, 1967, F 53,332

Int. Cl. C07c *173/00*

U.S. Cl. 260—239.57 3 Claims

(Androst-17β-yl)-α-pyrones, cardioactive per se and useful as intermediates in the manufacture of scillarenone and scillarenin, and methods for making the same by ring closure of 20-alkoxymethylene-21-carbalkoxymethylene or 20-formyl-21-carbalkoxymethylene steroids derived from 21-dialkoxy-20-keto steroid starting compounds.

3,574,199

6-(AMINOALKYL- AND AMINOALKYLIDENE)-1,1a,6,10b - TETRAHYDRO-DIBENZO[a,e]CYCLOPROPA[c]CYCLOHEPTENES

William E. Coyne and John W. Cusic, Skokie, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

No Drawing. Continuation-in-part of application Ser. No. 733,261, May 31, 1968. This application June 28, 1968, Ser. No. 740,977

Int. Cl. C07c *87/28*; C07d *51/70*

U.S. Cl. 260—240 6 Claims

1,1a,6,10b - tetrahydrodibenzo [a,e]cyclopropa[c]cycloheptenes having an aminoalkyl or an amino alkylidene substituent at the 6-position are described herein. They are prepared by starting from the appropriate 1,1a,6,10b-tetrahydrodibenzo[a,e]cyclopropa[c]cycloheptene - 6 - one. They are useful as antidepressants, and as anti-bacterial, anti-protozoal, and antialgal agents.

3,574,200

BASIC DYESTUFFS

Alfred Brack, Leverkusen, Germany, assignor to Farbenfabriken Bayer Aktiengesellschaft, Leverkusen, Germany

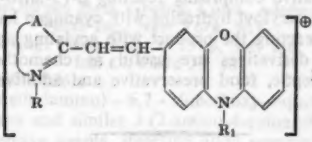
No Drawing. Filed Oct. 24, 1968, Ser. No. 770,408

Claims priority, application Germany, Nov. 2, 1967, P 16 44 674.5

Int. Cl. C09b *23/00*

U.S. Cl. 260—240 12 Claims

Dyestuffs are produced having the formula



in which A denotes the residual member of a heterocyclic 5- or 6-membered ring or a heterocyclic 5- or 6-membered ring carrying further anellated rings; R stands for hydrogen, an alkyl, aralkyl, cycloalkyl or aryl radical or for a dialkylamino group, and R being a residue further linked to A or to a ring anellated to A; R_1 represents an alkyl, aralkyl, cycloalkyl or aryl radical; X denotes an anionic radical; which dyestuffs are particularly adapted for dyeing, printing and mass dyeing of synthetic and semi-synthetic materials or for the production of inks and pastes and are characterized in such uses as being extremely fast.

3,574,201

5-NITROFURYL-1,2,4-OXADIAZINE DERIVATIVES

Hermann Breuer, Regensburg, Germany, assignor to E. R. Squibb & Sons, Inc., New York, N.Y.

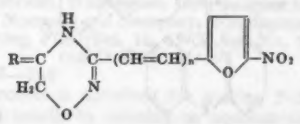
No Drawing. Filed July 30, 1969, Ser. No. 846,221

Claims priority, application Germany, Sept. 27, 1968, P 17 95 410.8

Int. Cl. C07d *87/52*

U.S. Cl. 260—240 10 Claims

5-nitrofuryl-1,2,4-oxadiazines of the formula



wherein R is oxygen, an imino group or a lower alkanoylimino group and *n* is zero or one, are useful as antimicrobial agents. A 3-(5-nitro-2-furyl)-5-halomethyl - 1,2,4-oxadiazole, upon treatment with aqueous alkali in a solvent or with liquid amomnia, yields, respectively, a compound of the above formula wherein R is oxygen or imino. The imino group may then be acylated.

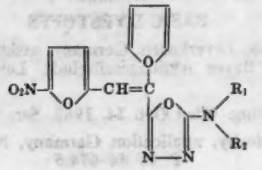
3,574,202

NOVEL NITROFURAN DERIVATIVE AND A PROCESS FOR THE PRODUCTION THEREOF

Ichiro Hirao and Yasuhiko Kato, Kitakyushu-shi, and Ryuzo Ueno, Nishinomiya-shi, Japan, assignors to Kabushiki Kaisha Ueno Seiyaku Oyo Kenkyujo, Osaka, Japan

No Drawing. Filed May 9, 1967, Ser. No. 637,061
Claims priority, application Japan, May 13, 1966, 41/30,527; July 21, 1966, 41/47,294; Feb. 7, 1967, 42/7,571; Feb. 28, 1967, 42/12,988, 42/12,989
Int. Cl. C07d *85/54*
U.S. Cl. 260—240.1 **4 Claims**

A nitrofuran derivative having the formula



wherein each of R_1 and R_2 is hydrogen or acyl group derived lower fatty acid, or both of R_1 and R_2 are hydroxy methyl group; and process for preparation of said nitrofuran derivative comprising reacting β-(5-nitro-2-furyl)-α-(2'-furyl)-acryloyl hydrazine with cyanogen halide, and if desired reacting the product with acylating agent, said nitrofuran derivatives are useful as chemotherapeutic agent, antiseptic, food preservative and additive to livestock feed.

3,574,203

2-SUBSTITUTED 5,6-DIHYDRO-4H-1,3-THIAZINES

Lloyd H. Conover, Quaker Hill, and James W. McFarland, Lyme, Conn., assignors to Chas. Pfizer & Co., Inc., New York, N.Y.

No Drawing. Filed Oct. 14, 1965, Ser. No. 496,138
Int. Cl. C07d *5/16, 27/22, 91/32, 93/06*
U.S. Cl. 260—243 **1 Claim**

A series of 5,6-dihydro-2-(substituted)ethyl- and 5,6-dihydro-2-(substituted)vinyl-4H-1,3-thiazines and their non-toxic acid addition salts useful in the veterinary control of helminthiasis.

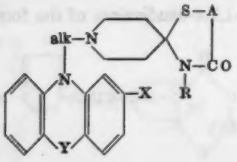
3,574,204

PIPERIDINE SPIRO COMPOUNDS

Michio Nakanishi, Oita, Katsuo Arimura and Tatsumi Tsumagari, Fukuoka, and Masami Shiroki, Oita, Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

No Drawing. Continuation-in-part of application Ser. No. 675,074, Oct. 13, 1967. This application July 3, 1969, Ser. No. 839,046
Int. Cl. C07d *93/14*
U.S. Cl. 260—243 **21 Claims**

The piperidine spiro compounds of the formula:



wherein X is H, Cl, CH_3—, CF_3—, CH_3O—, CH_3S— or CH_3CO—; Y is —S— or —CH_2CH_2—; alk is alkylene of 2 to 4 carbon atoms (e.g. ethylene, propylene, trimethylene or 2-methyltrimethylene); A is methylene, ethylene or ethylidene; and R is H or lower alkyl of at most 4 carbon atoms (e.g. methyl, ethyl, propyl or butyl) are useful as tranquilizers.

3,574,205

3-AMINO-2-(AMINOMETHYL)PROPIONAPHTHONES

Malcolm W. Moon, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

No Drawing. Filed July 5, 1967, Ser. No. 651,121
Int. Cl. C07d *87/34*
U.S. Cl. 260—246 **11 Claims**

Certain new 3 - amino - 2 - (aminomethyl)propionaphthones are active against bacteria and fungi. The amino groups may be broadly selected from disubstituted amino and saturated heterocyclic amino, and the naphthyl group may be substituted with alkyl, alkoxy, nitro, or halogen. Antifungal activity has been demonstrated against the bean root rot fungi, *Fusarium solani f. phaseoli* and *Rhizoctonia solani.*

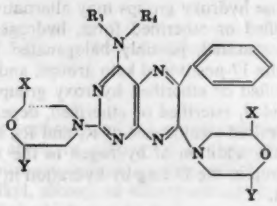
3,574,206

2,7-DIMORPHOLINO-4-AMINO-6-PHENYLPTERIDINES

Josef Roch, Biberach (Riss), Germany, assignor to Boehringer Ingelheim G.m.b.H., Ingelheim am Rhein, Germany

No Drawing. Continuation-in-part of application Ser. No. 541,973, Apr. 12, 1966. This application Apr. 1, 1968, Ser. No. 717,906
Claims priority, application Germany, Apr. 15, 1965, P 16 20 498.1
Int. Cl. C07d *87/40*
U.S. Cl. 260—246 **6 Claims**

Compounds of the formula



wherein

X and Y are each hydrogen or methyl,

R_3 is alkyl of 1 to 4 carbon atoms, benzyl, cyclohexyl or monohydroxyalkyl of 2 to 3 carbon atoms, and

R_4 is alkyl of 2 to 6 carbon atoms in which at least one of the carbon atoms except that adjacent to the nitrogen atom is monohydroxy-substituted;

the compounds are useful as coronary dilators in warm-blooded animals.

3,574,207

PROCESS FOR PREPARING MORPHOLINES

Zdzislaw J. Dudzinski, Clifton, N.J., assignor to Millmaster Onyx Corporation, New York, N.Y.

No Drawing. Original application May 8, 1967, Ser. No. 636,664. Divided and this application Jan. 2, 1970, Ser. No. 412
Int. Cl. C07d *87/26*
U.S. Cl. 260—247 **6 Claims**

Tertiary aliphatic amines are prepared by the reaction of 1-chloroalkanes or 1-bromoalkanes with secondary amines in a solventless environment at a temperature at

least as high as room temperature, but preferably ranging from about 100° to 160° C., and at a pressure of about ambient for high boiling reactants and about 285 to 350 p.s.i. for low boiling or gaseous reactants. An alkali is preferably also present in the reaction mixture.

3,574,208

3-TERTIARYAMINO PROPIONYL-BENZO FURAN-2-CARBOXYLIC ACID

Janos Zergenyi, Riehen, and Ernst Habicht, Oberwil, Switzerland, assignors to Geigy Chemical Corporation, Ardsley, N.Y.

No Drawing. Filed July 22, 1968, Ser. No. 746,268
Int. Cl. C07d *87/36*
U.S. Cl. 260—247.2 **5 Claims**

5-(2 - di(lower)alkylaminomethyl - (lower)alkanoyl) - benzofuran-2-carboxylic acids and their pharmaceutically acceptable salts with acids and bases are prepared by Mannich condensation of 5-lower-alkanoyl-substituted benzofuran-2-carboxylic acids with paraform-adehyde and secondary amines. A typical embodiment is 5-(2-dimethylaminomethyl - butyryl)-6-methyl-benzofuran-2-carboxylic acid hydrochloride. A method of producing a diuretic and a saluretic effect comprising administration of said compounds to warm-blooded animals as well as pharmaceutical compositions containing said compounds are provided.

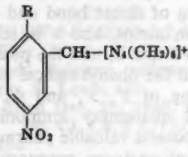
3,574,209

QUATERNARY AMMONIUM SALTS OF METHENAMINE

Hans Suter, Dorflingen, and Hans Zutter, Schaffhausen, Switzerland, assignors to Schweizerisches Serum- und Impfinstitut und Institut zur Erforschung von Infektionskrankheiten, Bern, Switzerland

No Drawing. Filed May 26, 1969, Ser. No. 827,950
Claims priority, application Switzerland, June 27, 1968, 9,641/68
Int. Cl. C07d *55/52*
U.S. Cl. 260—248.5 **3 Claims**

Quaternary ammonium salts of the formula



wherein R is hydroxy or lower alkoxy, and X^- is the anion of a physiologically tolerated acid at least as strong as phosphoric acid have been found to have antimicrobial effects on many types of pathogenic microorganisms which cause infections of the intestinal and urinary tract.

3,574,210

2,4-DISUBSTITUTED-6-NITRO- AND 6-AMINOQUINAZOLINES

Hermann Breuer, Regensburg, Erich Cohnen, Tegernheim, and Egon Roesch, Regensburg, Germany, assignors to E. R. Squibb & Sons, Inc., New York, N.Y.

No Drawing. Filed July 12, 1968, Ser. No. 744,336
Claims priority, application Germany, July 13, 1967, P 16 70 445.3
Int. Cl. C07d *51/48*
U.S. Cl. 260—251 **7 Claims**

This invention relates to certain new 2,4-disubstituted-6-aminoquinazolines and the 2,4 - disubstituted - 6 - nitroquinazolines from which they are produced. The former are useful as anti-inflammatory agents.

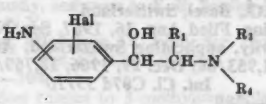
3,574,211

1-(AMINO-MONOHALO-PHENYL)-2-AMINO-ALKANOLS AND SALTS

Johannes Keck, Gerd Kruger, and Hans Machleidt, Biberach, Riss, Klaus Noll, Warthausen-Oberhofen, and Gunther Engelhardt and Albrecht Eckenfels, Biberach, Riss, Germany, assignors to Boehringer Ingelheim G.m.b.H., Ingelheim am Rhein, Germany

No Drawing. Filed May 1, 1968, Ser. No. 725,945
Claims priority, application Germany, May 9, 1967, T 33,824
Int. Cl. C07c *91/22*; C07d *57/36*
U.S. Cl. 260—253 **4 Claims**

1-(amino-monohalo-phenyl)-2-amino-alkanols of the formula



wherein

R_1 is hydrogen or alkyl of 1 to 3 carbon atoms,
R_3 and R_4 are each hydrogen, lower alkyl, lower alkenyl, hydroxy-lower alkyl, lower alkoxy-lower alkyl, cyclohexyl, phenyl or benzyl, and
Hal is chlorine, bromine or iodine,

and non-toxic, pharmacologically acceptable acid addition salts thereof, useful as analgesics in warm-blooded animals.

3,574,212

QUINAZOLINYLUREAS

Hans-Jurgen Hess, Groton, Conn., asisgnor to Pfizer Inc., New York, N.Y.

No Drawing. Filed Feb. 2, 1968, Ser. No. 702,534
Int. Cl. C07d *51/48*
U.S. Cl. 260—256.4 **6 Claims**

1-[2-dimethylamino) - 6,7 - dimethoxy-4-quinazolinyl]-3-methylurea and similar 1-(2-amino-4-quinazolinyl)ureas are hypotensive agents. Reacting alkyl isocyanate with a 2-amino-4-(unsubstituted amino)quinazoline affords the 1-(4-quinazolinyl)-3-alkylureas; reacting a 2-amino-4-(unsubstituted amino)quinazoline with inorganic cyanate and hydrochloric acid affords the 1-(4-quinazolinyl)urea.

3,574,213

4,6-DI(LOWER ALKYL) PYRIMIDIN-2-YL PHTHALAZINE

John J. D'Amico, Dunbar, W. Va., assignor to Monsanto Company, St. Louis, Mo.

No Drawing. Application Oct. 11, 1967, Ser. No. 705,572, now Patent No. 3,454,572, which is a division of application Ser. No. 513,558, Dec. 13, 1965, now Patent No. 3,379,700. Divided and this application Oct. 1, 1968, Ser. No. 766,026
Int. Cl. C07d *57/00*
U.S. Cl. 260—256.5 **2 Claims**

S-(phthalazin-1-yl)- and S-(1H-1,2,4-triazol-5-yl)-thioazoles, thiopyrimidines, and dithiocarbamates are described which are useful for accelerating vulcanization of rubber.

3,574,214

HYPOCHLORITE PROCESS FOR CHLOROURACILS

Earl W. Cummins, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

No Drawing. Filed Oct. 16, 1967, Ser. No. 675,324
Int. Cl. C07d *51/30*
U.S. Cl. 260—260 **7 Claims**

A new process is described for making 5-chloro-3,6-disubstituted uracils by reacting an aqueous solution of

an alkali metal salt of a 3,6-disubstituted uracil with aqueous sodium or potassium hypochlorite. After the hypochlorite chlorination has been completed, acid is added to produce crystals of the 5-chloro-3,6-disubstituted uracil. Subsequently the solid product is recovered by filtration or centrifugation and washed and dried.

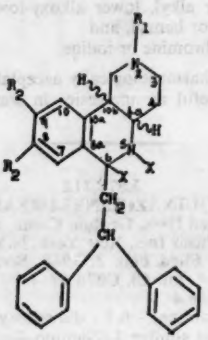
3,574,215

NAPHTHYRIDINE DERIVATIVE COMPOUNDS HAVING A BENZO[c][1,6]NAPHTHYRIDINE STRUCTURE

Adolf Lindenmann, Basel, and Rudolf Suess, Bettingen, Switzerland, assignors to Sandoz Ltd., also known as Sandoz A.G., Basel, Switzerland

No Drawing. Filed Aug. 16, 1967, Ser. No. 660,910
Claims priority, application Switzerland, Aug. 18, 1966, 11,953/66; Dec. 29, 1966, 18,769/66
Int. Cl. C07d *35/10*
U.S. Cl. 260—288 11 Claims

The invention provides naphthyridine derivatives of Formula I,



in which

R_1 signifies lower alkyl or benzyl, each of the two symbols
R_2 signifies hydrogen, hydroxy or lower alkoxy, or the symbols
R_2 together signify methylenedioxy, and each of the two symbols
X signifies hydrogen, or the symbols
X together signify a second bond between the carbon and the nitrogen atom,

and their salts with inorganic or organic acids.

3,574,216

QUATERNARY 3-PYRIDINIUM-2-QUINOLONES

Stanley C. Bell, Penn Valley, Pa., assignor to American Home Products Corporation, New York, N.Y.

No Drawing. Filed Apr. 12, 1968, Ser. No. 721,095
Int. Cl. C07d *33/50*
U.S. Cl. 260—288 3 Claims

Quaternary 3-pyridinium-2-quinolones, particularly inner salts of 3-pyridinium 6-chloro-1,2-dihydro-4-substituted-2-oxoquinolines (I), especially the 4-(2-chloro-5-sulfamoylphenyl) derivative thereof bearing a 3-[1-hydroxy-N-(p-tolylsulfonyl)formamidoyl] group on the pyridinium ring thereof (Ia), and the 4-hydroxy derivative thereof (Ib), are prepared from the corresponding 2-pyridinium acetanilide (II) by heating until cyclization is substantially complete or by treatment with a base, respectively. Compounds (I) and (II) are pharmacologically active, especially as central nervous system depressants.

3,574,217

PROCESS FOR SUBSTITUTING AROMATICALLY BOUND HALOGEN BY HYDROGEN

Wilhelm Mack, Olching-Upper Bavaria, Germany, assignor to Consortium fur Elektrochemische Industrie G.m.b.H., Munich, Bavaria, Germany

No Drawing. Filed May 29, 1968, Ser. No. 732,889
Claims priority, application Germany, June 5, 1967, C 42,539
Int. Cl. C07b *1/00*
U.S. Cl. 260—293.4 7 Claims

This invention relates to replacing aromatically bound halogen by hydrogen in aromatic polyhalogen compounds, and it has for its object to provide a novel and efficient process for this purpose.

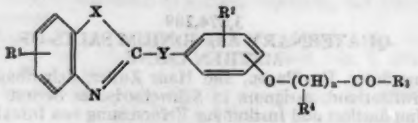
3,574,218

2-ARYL- OR ARALKYL-SUBSTITUTED BENZAZOLE DERIVATIVES

Kalman Hideg, Olga Hideg nee Hankovszky, Laszlo Szekeres, Gyula Mehes, and Gyula Papp, Pecs, Hungary, assignors to Egyesult Gyogyszer-Es Tapszergyar, Budapest, Hungary

No Drawing. Continuation-in-part of application Ser. No. 643,069, June 2, 1967. This application Aug. 11, 1969, Ser. No. 849,145
Int. Cl. C07d *85/48, 91/44, 49/38*
U.S. Cl. 260—293.4 1 Claim

New compounds having the general formula



wherein R^1 is selected from the group consisting of hydrogen and chlorine, R^2 is selected from the group consisting of hydrogen and lower alkoxy, R^3 is selected from the group consisting of piperidino and α-methyl-benzylamino radicals, R^4 is selected from the group consisting of hydrogen and methyl radical, X is selected from the group consisting of =O, =S, and =NH, Y is selected from the group consisting of direct bond and alkylene having from 1 to 2 carbon atoms, and *n* is selected from the group consisting of 1 and 2, and the positions of R^2 and of the ether bond in the phenyl radical are selected from the group consisting of 2′, 3′, and 4′, and their acid addition salts and quaternary ammonium derivatives. These compounds possess valuable pharmacological properties. They show anti-anginose, coronary vasodilator and peripheral circulation enhancing effects.

3,574,219

1-(β-HYDROXYPHENETHYL)-2,3-DIMETHYL-3-(3-HYDROXYPHENYL)-PIPERIDINE

Hiroshi Kugita and Hirozumi Inoue, Tokyo-to, and Goro Hayashi, Osaka-fu, Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

No Drawing. Filed Sept. 16, 1968, Ser. No. 762,354
Claims priority, application Japan, Sept. 27, 1967, 42/62,167, 42/62,168
Int. Cl. C07d *29/16*
U.S. Cl. 260—294.7 1 Claim

The compound 1-(β-hydroxyphenethyl)-2,3-dimethyl-3-(3-hydroxyphenyl)-piperidine and its acid salts have analgesic activity.

Methods for manufacturing the compound and acid salts including reaction of 2,3-dimethyl-3-(3-hydroxyphenyl)-piperidine with styrene-oxide or reduction of 1-phenacyl-2,3-dimethyl-3-(3-hydroxyphenyl)-piperidine followed by acidification to form the acid salts.

3,574,220

1,7-METHANO-1H-1-BENZAZEPIN-5(4H)-ONES

Stephen I. Sallay, Wynnewood, Pa., assignor to American Home Products Corporation, New York, N.Y.

No Drawing. Original application Oct. 2, 1967, Ser. No. 671,966. Divided and this application Aug. 14, 1969, Ser. No. 870,997

Int. Cl. C07d *39/00*

U.S. Cl. 260—294.7 2 Claims

This invention is concerned with new and novel derivatives of iboga alkaloids which are pharmacologically efficacious as central nervous system stimulants. Further, this invention relates to new and novel intermediates for the preparation of iboga alkaloids and their new and novel derivatives by a totally synthetic, commercially applicable process.

3,574,221

DERIVATIVES OF AMINOALKYL PYRIDINES

Olga Hankovszky, Kálmán Hideg, Gyula Méhes, László Decsi, and Mária Várszegi, Pecs, Hungary, assignors to Egyesult Gyogyszer-Es Tapszergyar, Budapest, Hungary

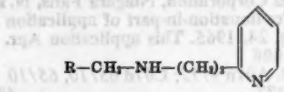
No Drawing. Continuation-in-part of application Ser. No. 641,164, May 25, 1967. This application Oct. 2, 1969, Ser. No. 863,382

Claims priority, application Hungary, May 28, 1966, EE 1,251

Int. Cl. C07d *31/42*

U.S. Cl. 260—294.8 1 Claim

The invention relates to novel 2-pyridylethyl-benzylamine derivatives having the general formula



wherein R is a mono-, di- or trisubstituted phenyl group, and the substituents of the phenyl group can be hydroxy, alkoxy containing 1 or 2 carbon atoms, methylenedioxy, nitro, dimethylamino or halogen groups. These compounds as well as their therapeutically acceptable acid addition salts and quaternary ammonium derivatives possess valuable analgesic and tranquillo-sedative activity.

3,574,222

PREPARATION OF 5-AMINO-1,2,4-OXADIAZOLES

Fernand G. F. Eloy, Rhode St. Genese, and René A. V. Lenaers, Brussels, Belgium, assignors to Mallinckrodt Chemical Works, St. Louis, Mo.

No Drawing. Filed Dec. 29, 1965, Ser. No. 517,433

Int. Cl. C07d *85/52*

U.S. Cl. 260—296 1 Claim

The preparation of 5-amino-1,2,4-oxadiazoles by reacting the corresponding 5-trihalomethyl-1,2,4-oxadiazole with the corresponding amine. The compounds may be used as curing agents or hardeners for epoxy resin systems and as nematocides.

3,574,223

5-SUBSTITUTED-O,O-DIALKYL-S - [(1,2,4-THIADIAZOL - 3 - YL)METHYL] PHOSPHOROTHIOATES AND -DITHIOATES

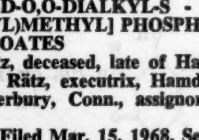
Rudi F. W. Rätz, deceased, late of Hamden, Conn., by Margot I. H. Rätz, executrix, Hamden, and John F. Cronan, Waterbury, Conn., assignors to The Ansul Company

No Drawing. Filed Mar. 15, 1968, Ser. No. 713,545

Int. Cl. C07e *9/16*

U.S. Cl. 260—302 17 Claims

Compounds having the formula



wherein R is alkyl; X is oxygen or sulfur; and R′ is OR, SR, NH_2, NHR or NR_2 wherein R is alkyl are provided by reacting 5-substituted 3-chloromethyl-1,2,4-thiadiazoles with alkali metal or ammonium salts of dialkyl phosphorothioates and -dithioates. These compounds are useful agricultural chemicals; for example, they are particularly valuable insecticides.

3,574,224

5-METHYLISOINDOLO[1,2-b]BENZOTHIAZOL-12-ONE

Hans Hoehn, Regeusburg, and Egon Roesch, Lampertheim, Germany, assignors to E. R. Squibb & Sons, Inc., New York, N.Y.

No Drawing. Filed July 12, 1968, Ser. No. 744,304

Int. Cl. C07d *99/06*

U.S. Cl. 260—304 1 Claim

This invention relates to 5-methylisoindolo[1,2-b]benzothiazol-12-one which is useful as an anti-inflammatory agent.

3,574,225

6-AMINOPENICILLANIC ACID

Jeffery Edward Munden, Horsham, England, assignor to Beecham Group Limited, Brentford, England

No Drawing. Filed Nov. 8, 1966, Ser. No. 592,754

Claims priority, application Great Britain, Nov. 18, 1965, 48,995/65

Int. Cl. C07d *99/18*

U.S. Cl. 260—306.7 8 Claims

Procedure is provided for removing high molecular weight antigenic material from 6-aminopenicillanic acid produced at least partially by a microbiological process. The procedure is essentially carried out by making up a neutral solution of 6-aminopenicillanic acid, adding a protein denaturant such as Odex No. 1, introducing an adsorbent such as aluminum hydroxide and obtaining purified 6-aminopenicillanic acid in solution for the preparation of penicillins therefrom or recovering the 6-aminopenicillanic acid by precipitation at the isoelectric point.

3,574,226

SUBSTITUTED Δ^2-1,2,4-THIADIAZOLIN-5-ONES

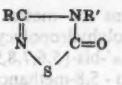
Rudi F. W. Ratz, Hamden, and John F. Cronan, Waterbury, Conn., assignors to The Ansul Company

No Drawing. Filed May 19, 1967, Ser. No. 639,648

Int. Cl. C07d *91/60*

U.S. Cl. 260—306.7 27 Claims

A novel series of substituted Δ^2-1,2,4-thiadiazolin-5-ones having the formula



wherein R is haloalkyl, diphenylalkyl, triphenylalkyl, substituted diphenylalkyl, substituted triphenylalkyl, aryloxyalkyl, haloaryloxyalkyl or dialkylaminomethyl and R′ is hydrogen, alkyl, alkali metal, ammonium, alkylammonium, hydroxyalkyl or hydroxyalkoxoalkyl has been provided. The thiadiazolin-5-one wherein R′ is hydrogen is provided by the reaction of a 5-halo-1,2,4-thiadiazole with an aliphatic acid; this compound is reacted with a variety of materials to provide various other substituted Δ^2-1,2,4-thiadiazolin-5-ones. The new compounds are useful as agricultural chemicals. For example, they are effective fungicides, herbicides, algaecides and insecticides.

3,574,227

ACID-ADDITION SALTS OF TETRAMISOLE

Irene Lesley Rimington and Michael Dudley Ward, Macclesfield, England, assignors to Imperial Chemical Industries Limited, London, England

No Drawing. Filed Dec. 20, 1968, Ser. No. 785,775
Claims priority, application Great Britain, Jan. 8, 1968, 1,056/68
Int. Cl. C07d *99/06*
U.S. Cl. 260—306.7 1 Claim

The disclosure concerns virtually tasteless salts of dl-tetramisole and l-tetramisole, a process for preparing said salts, and pharmaceutical and veterinary compositions comprising them. A representative salt is di-dl-tetramisole embonate.

3,574,228

2-ARYL OXAZOLES

Kevan Brown, Woodley, England, assignor to John Wyeth & Brothers Limited

No Drawing. Filed June 12, 1968, Ser. No. 736,262
Claims priority, application Great Britain, June 14, 1967, 27,382/67
Int. Cl. C07d *85/44*
U.S. Cl. 260—307 3 Claims

It has been found that a small group of 2-aryl oxazoles, namely, 2,5-diphenyloxazol-4-ylacetic acid, 2-(p-chlorophenyl)-oxazol-4-ylacetamide, 2-(p-chlorophenyl)oxazol-4-ylacetic acid, and 2,4-diphenyloxazol-5-ylacetic acid, have antiinflammatory action as shown by standard pharmacological tests on laboratory animals, and are therefore of value in experimental pharmacology and therapy for the control, prevention, and relief of inflammation.

3,574,229

AZIRIDINYL PHTHALOCYANINE PIGMENT

Roy A. Pizzarello, Franklin Lakes, and Alfred F. Schneid and John J. De Lucia, New Milford, N.J., assignors to Inmont Corporation, New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 360,099, Apr. 15, 1964, which is a continuation-in-part of applications Ser. No. 62,827, Ser. No. 62,856, and Ser. No. 62,873, all filed Oct. 17, 1960. This application Sept. 26, 1967, Ser. No. 670,758
Int. Cl. C07d *27/76;* C09b *47/04*
U.S. Cl. 260—314.5 1 Claim

A water-insoluble reactive green pigment which is copper phthalocyanine-3,3',3''-tri-(methylaziridinyl) sulfonimide is prepared. The pigment can be used in textile printing and the like.

3,574,230

POLYHALOPOLYHYDROPOLYCYCLICDICARBOXYLIC ACID IMIDES

Henry A. Cyba, Evanston, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Sept. 5, 1968, Ser. No. 757,764
Int. Cl. C07d *27/52*
U.S. Cl. 260—326 10 Claims

Novel compositions of matter comprising haloaryl imides of polyhalopolyhydropolycyclicdicarboxylic acids as exemplified by α,α'-bis-[5,6,7,8,9,9-hexachloro-1,2,3,4,4a,5,8,8a - octahydro - 5,8-methano-2,3-naphthalenedicarboximido]-2,3,5,6-tetrachloro-p-xylene are useful as additives for plastics, polymers, resins, etc. whereby flameproof or fire-retardant properties are added thereto.

3,574,231

N-SUBSTITUTED POLYHALOPOLYHYDROPOLYCYCLICDICARBOXIMIDES

Alexander Gaydasch, Chicago, Ill., assignor to Universal Oil Products Company, Des Plaines, Ill.

No Drawing. Filed Sept. 5, 1968, Ser. No. 767,546
Int. Cl. C07d *27/52*
U.S. Cl. 260—326 10 Claims

Novel compositions of matter comprising N-substituted polyhalopolyhydropolycyclicdicarboximides in which the substituent on the imide contains at least two nitrogen atoms as exemplified by N-guanyl-5,6,7,8,9,9-hexachloro-1,2,3,4,4a,5,8,8a-octahydro-5,8-methano - 2,3 - naphthalene-dicarboximide are useful as additives for plastics, polymers, resins, etc. whereby flameproof or fire-retardant properties are added thereto.

3,574,232

3-AMINOALKYL-1-PHENYL-INDOLINES

Antonio Cañas-Rodriguez and Peter R. Leeming, Canterbury, England, assignors to Pfizer Inc., New York, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 706,672, Feb. 19, 1968. This application Apr. 4, 1968, Ser. No. 718,943
Claims priority, application Great Britain, Feb. 21, 1967, 8,172/67
Int. Cl. C07d *27/38, 27/40*
U.S. Cl. 260—326.11 14 Claims

Novel 3-aminoalkyl-1-phenyl-indolines and 2-indolinones are disclosed.

The antidepressant properties of these compounds as well as certain other 2-indolinone analogs thereof are also disclosed.

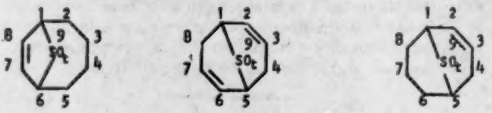
3,574,233

BICYCLIC SULFUR COMPOUNDS

Edward D. Weil, Yonkers, N.Y., assignor to Hooker Chemical Corporation, Niagara Falls, N.Y.

No Drawing. Continuation-in-part of application Ser. No. 482,287, Aug. 24, 1965. This application Apr. 1, 1968, Ser. No. 718,006
Int. Cl. A01n *9/12;* C07d *63/10, 65/10*
U.S. Cl. 260—327 12 Claims

Compounds selected from the group consisting of



wherein *t* is a number from 0 to 2. These compounds are pesticidal.

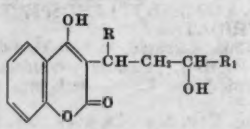
3,574,234

DERIVATIVES OF 4-HYDROXY COUMARINE

Eugene Boschetti, Venissieux, Darius Molho, Boulogne-sur-Seine, and Louis Fontaine, Lyon, France, assignors to Lipha, Lyonnaise Industrielle Pharmaceutique

No Drawing. Filed Dec. 11, 1967, Ser. No. 689,347
Claims priority, application France, Dec. 13, 1966, 87,213; Nov. 13, 1967, 127,915
Int. Cl. A61k *27/00;* C07d *63/12*
U.S. Cl. 260—332.2 6 Claims

4-hydroxy coumarines represented by the formula



in which:

R is a member of the group formed by the thienyl, methyl-thienyl, halothienyl and nitrothienyl radicals; and

R_1 is a member of the group formed by the methyl, phenyl, halophenyl, nitrophenyl, diphenyl, halodiphenyl and nitrodiphenyl radicals, and processes for their preparation.

3,574,235

SEPARATION OF A MIXTURE OF DIASTEREOISOMERS OF ZEARALANOL

Vernon V. Young, Terre Haute, Ind., assignor to Commercial Solvents Corporation

No Drawing. Filed June 6, 1967, Ser. No. 643,819
Int. Cl. C07d 9/00
U.S. Cl. 260—343.2 8 Claims

A mixture of diastereoisomers is formed when zearalenone is catalytically reduced to zearalanol in the presence of hydrogen. A portion of the high melting diastereoisomer can be separated out by known means. The remaining mixture can be separated into its constituents by dissolving the mixture in warm glacail acetic acid, cooling the solution, and then diluting the solution with water. The low melting isomer (155°–157° C.) crystallizes out when the solution is cooled and the high melting isomer (180°–181°C.) crystallizes out when the solution is subsequently diluted.

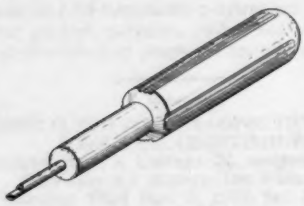
DESIGNS

APRIL 6, 1971

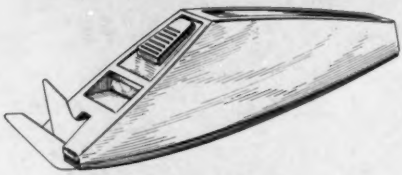
220,375
CHOCOLATE CONFECTION
Amilcare Dogliotti, Neive, Cuneo, Italy
Filed Mar. 4, 1969, Ser. No. 16,017
Claims priority, application Italy Sept. 12, 1968
Term of patent 14 years
Int. Cl. D1—*02*
U.S. Cl. D1—12

220,376
PROTECTIVE HEAD GEAR
Jake E. Brown, 517 18th Ave. N. 98122, and James B. Sorenson, 1530 NE. 95th St. 98114, both of Seattle, Wash.
Filed Aug. 27, 1969, Ser. No. 18,870
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—232

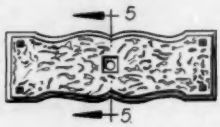
220,377
EXTRACTION TOOL
David Van Dike Benfer, Marysville, Pa., assignor to AMP Incorporated, Harrisburg, Pa.
Filed Feb. 3, 1970, Ser. No. 21,300
Term of patent 3½ years
Int. Cl. D8—*02*
U.S. Cl. D8—14



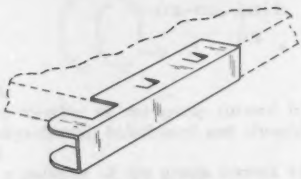
220,378
ELECTRIC SCISSORS
William Lovett Gamble, Unionville, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.
Filed Dec. 16, 1969, Ser. No. 20,521
Term of patent 14 years
Int. Cl. D8—*02*
U.S. Cl. D8—61



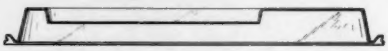
220,379
BACKPLATE OR THE LIKE
Bernie Bill Baker, Lawrence, Kans., assignor to Keystone Consolidated Industries, Inc., Peoria, Ill.
Filed June 4, 1969, Ser. No. 17,516
Term of patent 14 years
The portion of the term of the patent subsequent to Apr. 23, 1983, has been disclaimed
Int. Cl. D8—*03*
U.S. Cl. D8—179



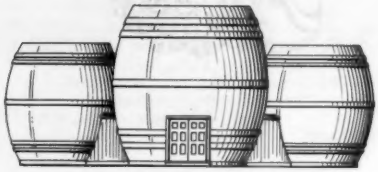
220,380
LENS PANEL HINGE PIN
Charles O. Hughes, St. Louis, and Thomas Akin, Clayton, Mo., assignors to Emerson Electric Co., St. Louis, Mo.
Filed July 8, 1969, Ser. No. 18,117
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—259



220,381
COVER FOR A TRAY FOR FOOD
Travis Starr Buxton, Luton Airport, London, England, assignor to Courtain Catering Limited, Luton Airport, London, England
Filed May 19, 1969, Ser. No. 17,212
Claims priority, application Great Britain Nov. 18, 1968
Term of patent 14 years
Int. Cl. D9—*02*
U.S. Cl. D9—254

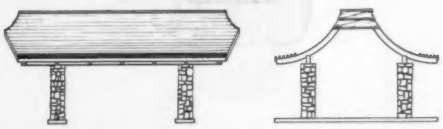


220,382
RESTAURANT
Howard Cooper, 400 E. Randolph St., Chicago, Ill. 60601
Filed Oct. 11, 1968, Ser. No. 13,952
Term of patent 14 years
Int. Cl. D25—*04*
U.S. Cl. D13—1



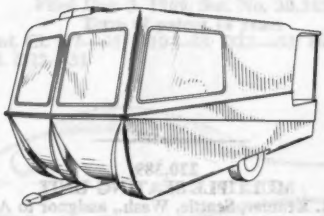
220,383
SERVICE BUILDING
Donald L. Nelson, Aqua Vista, Orinda, Calif. 94563, and Lynn T. Evans, 2301 Larkin St., San Francisco, Calif. 94109
Filed Nov. 19, 1969, Ser. No. 20,173
Term of patent 3½ years
Int. Cl. D25—*04*
U.S. Cl. D13—1

220,384
SERVICE CANOPY
Donald L. Nelson, Aqua Vista, Orinda, Calif. 94563, and Lynn T. Evans, 2301 Larkin St., San Francisco, Calif. 94109
Filed Nov. 19, 1969, Ser. No. 20,174
Term of patent 3½ years
Int. Cl. D25—*04*
U.S. Cl. D13—1

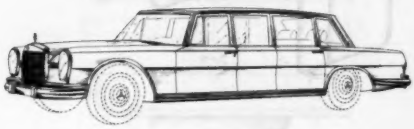


220,385
GARDEN CENTER BUILDING
Frank T. McCoy, Jr., Nashville, Tenn., assignor to Hardi-Gardens, Inc., Nashville, Tenn.
Filed Dec. 9, 1969, Ser. No. 20,417
Term of patent 14 years
Int. Cl. D25—*04*
U.S. Cl. D13—1

220,386
COMBINED TRAVEL TRAILER AND BOAT
Frank S. Kovach, South Bend, Ind., assignor to Buccaneer Travel Trailer Corporation, Osceola, Ind.
Filed Dec. 24, 1969, Ser. No. 20,636
Term of patent 3½ years
Int. Cl. D12—*10*
U.S. Cl. D14—3

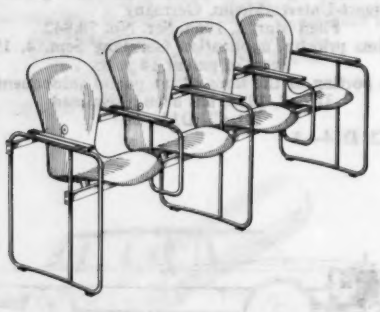


220,387
AUTOMOBILE
Friedrich Geiger, Boblingen, and Carl Wilfert, Waldstadt, Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany
Filed Mar. 2, 1964, Ser. No. 78,842
Claims priority, application Germany Sept. 4, 1963
Term of patent 14 years
The portion of the term of the patent subsequent to Dec. 7, 1979, has been disclaimed
Int. Cl. D12—*08*
U.S. Cl. D14—3

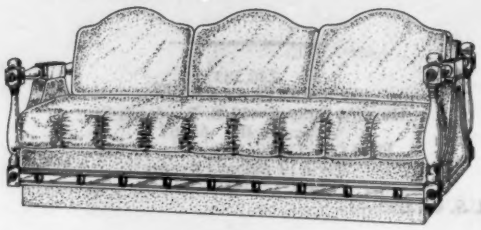


220,388
CHAIR
Gideon A. Kramer, Seattle, Wash., assignor to American Desk Manufacturing Co., Temple, Tex.
Filed Mar. 17, 1969, Ser. No. 16,259
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—1

220,389
MULTIPLE SEATING UNIT
Gideon A. Kramer, Seattle, Wash., assignor to American Desk Manufacturing Co., Temple, Tex.
Filed Mar. 17, 1969, Ser. No. 16,296
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—8

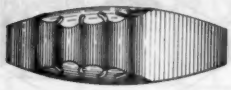


220,390
SOFA
Hubert Howard Watson and Mike Stewart Watson, Galax, Va., assignors to Sawyers Furniture Company, Galax, Va.
Filed July 31, 1969, Ser. No. 18,481
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D15—11



220,391
VITAMIN TABLET OR SIMILAR ARTICLE
Luther H. Kroninger, Jr., Huntington, N.Y., George W. Lehmann, Westfield, N.J., and Dean R. Straka, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.
Filed Apr. 17, 1970, Ser. No. 22,478
Term of patent 14 years
Int. Cl. D28—*01*; D1—*02*
U.S. Cl. D16—3

220,392
VITAMIN TABLET OR SIMILAR ARTICLE
Luther H. Kroninger, Jr., Huntington, N.Y., George W. Lehmann, Westfield, N.J., and Dean R. Straka, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.
Filed Apr. 17, 1970, Ser. No. 22,479
Term of patent 14 years
Int. Cl. D28—*01;* D1—*02*
U.S. Cl. D16—3

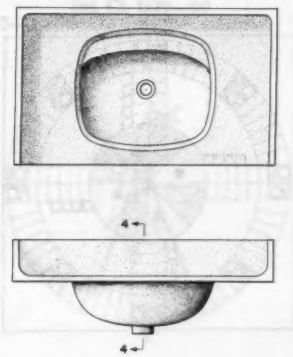


220,393
VITAMIN TABLET OR SIMILAR ARTICLE
Luther H. Kroninger, Jr., Huntington, N.Y., George W. Lehmann, Westfield, N.J., and Dean R. Straka, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.
Filed Apr. 17, 1970, Ser. No. 22,486
Term of patent 14 years
Int. Cl. D28—*01;* D1—*02*
U.S. Cl. D16—3

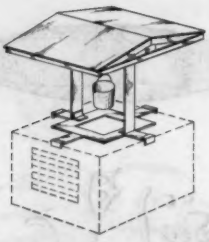
220,394
VITAMIN TABLET OR SIMILAR ARTICLE
Luther H. Kroninger, Jr., Huntington, N.Y., George W. Lehmann, Westfield, N.J., and Dean R. Straka, Evansville, Ind., assignors to Bristol-Myers Company, New York, N.Y.
Filed Apr. 21, 1970, Ser. No. 22,540
Term of patent 14 years
Int. Cl. D28—*01;* D1—*02*
U.S. Cl. D16—3

220,395
COMBINATION FISH RULER, SCALER, AND COMPASS
Patrick Garelli and St. Barth Alaska, both of 3812 S. Scoville Ave., Berwyn, Ill. 60402
Filed Dec. 3, 1969, Ser. No. 20,342
Term of patent 14 years
Int. Cl. D7—*06;* D10—*08;* D22—*08;* D8—*02*
U.S. Cl. D22—31

220,396
LAVATORY
Norman Van Skyhawk, Salt Lake City, Utah, assignor to American Standard Inc., New York, N.Y.
Filed Oct. 6, 1969, Ser. No. 19,437
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—58

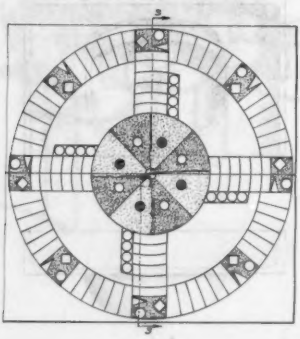


220,397
CANOPY FOR AIR CONDITIONING CONDENSER UNIT
William L. Melcher, 1102 Buoy Road, Houston, Tex. 77058
Filed Sept. 30, 1969, Ser. No. 19,345
Term of patent 14 years
Int. Cl. D23—*99*; D25—*99*
U.S. Cl. D23—167

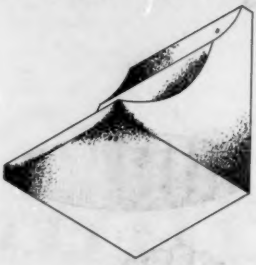


220,398
ORTHODONTIC DISPLAY MODEL
Bernard Geltzer, 8200 Ponce de Leon Road, Miami, Fla. 33143
Filed Nov. 12, 1969, Ser. No. 20,049
Term of patent 3½ years
Int. Cl. D24—*99*
U.S. Cl. D24—1

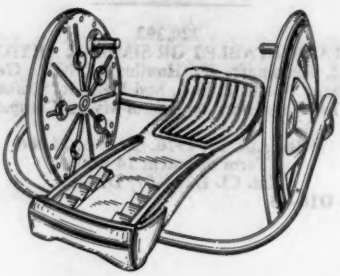
220,399
GAME BOARD
Frank W. Collett, Box 943, Fort Pierce, Fla. 33450
Filed Jan. 16, 1970, Ser. No. 20,959
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5



220,400
BUILDING BLANK FOR FORMING TOY FIGURES
Pansy E. Essman, 2207 Cunningham Ave., San Jose, Calif. 95122
Filed Apr. 14, 1969, Ser. No. 16,715
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15

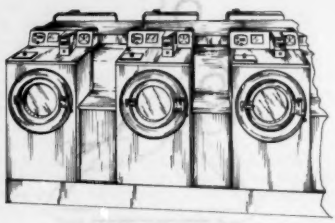


220,401
TOY VEHICLE
Calvin S. Cook, Erie, Pa., assignor to Louis Marx & Co. Inc., New York, N.Y.
Filed Feb. 16, 1970, Ser. No. 21,446
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—15



220,402
PITCHER
Howard W. Phillips, Franklin, Tenn., assignor to Aladdin Industries, Incorporated, Chicago, Ill.
Filed Jan. 28, 1970, Ser. No. 21,127
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D44—21

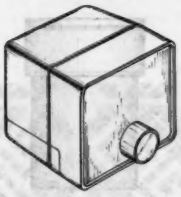
220,403
LAUNDRY WASHER UNIT
Jack W. Tipps, 1919 Ave. Q, Lubbock County, Tex. 79405
Filed May 5, 1969, Ser. No. 17,004
Term of patent 14 years
Int. Cl. D15—*06*
U.S. Cl. D49—1



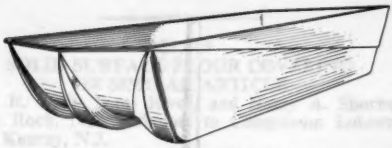
220,404
FORK OR SIMILAR ARTICLE
Jens H. Quistgaard, Copenhagen, Denmark, assignor to Dansk Designs, Ltd., Mount Kisco, N.Y.
Filed Jan. 26, 1970, Ser. No. 21,086
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D54—12

220,405
OPHTHALMIC SPECTACLES
Luc Andre Marcel Tagnon, Paris, France, assignor to Societe des Lunetiers, Societe en Commandite Simple, Paris, France
Filed Aug. 7, 1969, Ser. No. 18,580
Claims priority, application France Feb. 28, 1969
Term of patent 14 years
Int. Cl. D16—*08*
U.S. Cl. D57—1

220,406
SECURITY CAMERA
George Hardy, Huntington, N.Y., assignor to Bell Security Systems, Inc., New York, N.Y.
Filed Feb. 24, 1970, Ser. No. 21,594
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D61—1

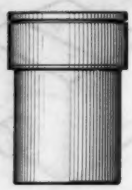


220,407
BOAT HULL
Frank S. Kovach, South Bend, Ind., assignor to Buccaneer Travel Trailer Corporation, Osceola, Ind.
Filed Dec. 24, 1969, Ser. No. 20,637
Term of patent 7 years
Int. Cl. D12—*06*
U.S. Cl. D71—1



220,408
BARRICADE
Robert H. Nygaard, 4701 Libra Place, Yorba Linda, Calif. 92686
Filed Jan. 19, 1970, Ser. No. 20,987
Term of patent 3½ years
Int. Cl. D29—*99*
U.S. Cl. D72—1

220,409
RECEPTACLE FOR MARKING PENS
James H. Lee and James R. Pauls, Walnut Creek, Calif., assignors to Dymo Industries, Inc., Emeryville, Calif.
Original design application May 7, 1968, Ser. No. 11,816, now Patent No. 217,838, dated June 16, 1970. Divided and this application Mar. 25, 1970, Ser. No. 22,043
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D74—5

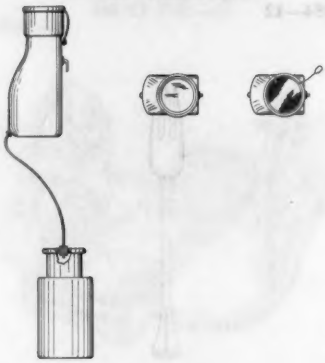


220,410
MARKING PEN
James H. Lee and James R. Pauls, Walnut Creek, Calif., assignors to Dymo Industries, Inc., Emeryville, Calif.
Original design application May 7, 1968, Ser. No. 11,816, now Patent No. 217,838, dated June 16, 1970. Divided and this application Mar. 25, 1970, Ser. No. 22,044
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D74—17

220,411
BALL POINT PEN OR THE LIKE
Robert Perlmutter, Flushing, N.Y., assignor to Duro Pen Company, Inc., Brooklyn, N.Y.
Filed Mar. 31, 1970, Ser. No. 22,146
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D74—17

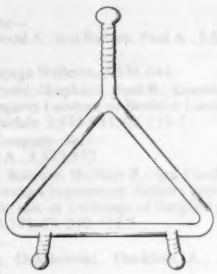
220,412
SHOE HANGER
Deborah E. Sussman, 11632 San Vicente Blvd., Los Angeles, Calif. 90049
Filed Aug. 4, 1969, Ser. No. 18,515
Term of patent 14 years
Int. Cl. D6—*07*
U.S. Cl. D80—8

220,413
URINATOR ASSEMBLY OR SIMILAR ARTICLE
Michael Pesce, 1034 Esplanade, Bronx, N.Y. 10461
Filed July 24, 1969, Ser. No. 18,381
Term of patent 14 years
Int. Cl. D24—*01, 05*
U.S. Cl. D83—1

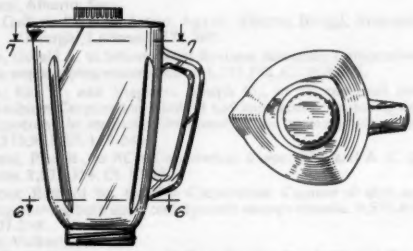


220,414
SOFT LUGGAGE
Leslie Marshall, 15 Pine St., Woodmere, N.Y. 11598
Filed Nov. 28, 1969, Ser. No. 20,316
Term of patent 14 years
Int. Cl. D3—*01*
U.S. Cl. D87—5

220,415
TODDLERS WALKING AID
Nancy S. Gerth, 791 Brookview Drive, Greenwood, Ind. 46142
Filed Jan. 30, 1970, Ser. No. 21,156
Term of patent 3½ years
Int. Cl. D24—*02*
U.S. Cl. D88—5

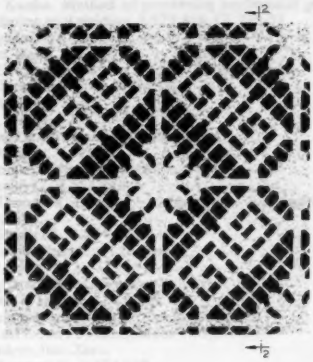


220,416
BLENDER JAR
Clarence Lee Folden, Downers Grove, Ill., assignor to Sears, Roebuck and Co., Chicago, Ill.
Filed June 12, 1970, Ser. No. 23,447
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D89—1

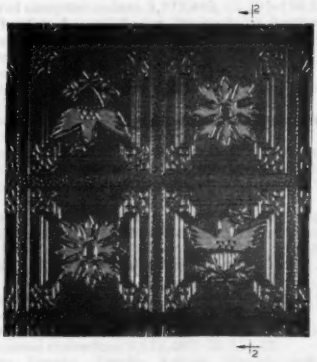


220,417
MOTORCYCLE CONTROL LEVER DUST SHIELD
Victor Alan Boocock, 757 Harvard Ave., Menlo Park, Calif. 94025
Filed Jan. 12, 1970, Ser. No. 20,897
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D90—1

220,418
SOLID SURFACE FLOOR COVERING OR SIMILAR ARTICLE
Robert R. Toth, Toms River, and William Currie, Kearny, N.J., assignors to Congoleum Industries, Inc., Kearny, N.J.
Filed May 5, 1969, Ser. No. 17,195
Term of patent 14 years
(Filed under Rule 47(a) and 35 U.S.C. 116)
Int. Cl. D6—*04*
U.S. Cl. D92—4



220,419
SOLID SURFACE FLOOR COVERING OR SIMILAR ARTICLE
Robert R. Toth, Toms River, and Harry A. Shortway, Glen Rock, N.J., assignors to Congoleum Industries, Inc., Kearny, N.J.
Filed May 5, 1969, Ser. No. 18,424
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D92—4



LIST OF PATENTEES

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Ahn, Kie Y.; and Viggiano, Joseph M., to International Business Machines Corporation. Method and apparatus for inducing unlaxial anisotropy in magnetic film thereby, and memory using the film. 3,573,981, Cl. 117-240.

Ahrens, Paul R., to RCA Corporation. Color killer and A. C. C. circuits. 3,573,354, Cl. 178-5.4

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Ajioka, James S.; and Du Hamel, Raymond H., to Hughes Aircraft Company. Broadband dielectric lens antenna fed by multi- conductor quasi-tem lines. 3,573,833, Cl. 343-753.

Ajioka, James S.; and Du Hamel, Raymond H., to Hughes Aircraft Company. Antenna with conical transmission line feed. 3,573,836, Cl. 343-777.

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Akers, Artie E., to North American Rockwell Corporation. Monitoring system. 3,573,817, Cl. 340-420.

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Alsop, Ranulph Michael; and Bremner, Ian, to Fisons Pharmaceuticals Limited. Process of preparing a ferric hydroxide-dextran complex. 3,574,184, Cl. 260-209.

Amakasu, Tatuo; and Yamazaki, Takao, to Kaushuha-netsuren Kabushiki Kaisha. Method of preserving mechanical properties of steel wire during spot welding. 3,573,418, Cl. 219-58.

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Anderson, Harold P.; and Simon, James L., to Bell Telephone Laboratories, Incorporated. Equipment to coordinate establishment of audio and video connections through switching systems. 3,573,377, Cl. 179-2.

Anderson, James Leroy; Gaedtke, Joachim Artur; and Mishkin, Abraham Rudolph, to Societe d'Assistance Technique pour Produits Nestle S.A. Vegetable extract production. 3,573,929, Cl. 99-71.

Anderson, Richard E., to General Electric Company. Condition responsive indicating instrument. 3,573,772, Cl. 340-187.

Anderson, Robert L.: *See*—
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Andersson, Jerker, to Allmanna Svenska Elektriska Aktiebolaget. Device in current converters. 3,573,603, Cl. 321-12.

Ando, Satoshi; Tanaka, Yusaku; Kojima, Minoru; and Fujimura, Kyoichi, to Kanegafuchi Boseki Kabushiki Kaisha, and Snia Viscosa Societa Nazionale Industria Applicazioni Viscosa S.p.A. Composite filament having reduced stickiness. 3,574,047, Cl. 161-173.

Andrew, Frederick Lyle: *See*—
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Andrews, Douglas R.; and Atrubin, Allan J., to International Business Machines Corporation. Stored logic recognition device. 3,573,730, Cl. 340-146.3

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andstede, Gerd: *See—*
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Antoniou, Andreas, to Postmaster General, Her Majesty's. Electrical impedance converting networks. 3,573,647, Cl. 330-69.

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Applied Electronics Corporation of N. J.: *See—*
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Ascoli, Enzo, to Paillard S. A. Plural path ink jet writing arrangement. 3,573,846, Cl. 346-75.

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Bachofer, Henry L.; and Shawhan, Elbert N. Metal detecting apparatus for conveyor belt. 3,573,784, Cl. 340-258.

Baer, Steven M., to Bell Telephone Laboratories, Incorporated. Time variable alert tone circuit for personal radio paging systems. 3,573,630, Cl. 325-392.

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Young, Vernon V., to Commercial Solvents Corporation. Separation of a mixture of diastereoisomers of zearalonol. 3,574,235, Cl. 260-343.2

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LIST OF REISSUE PATENTEES

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Benfer, David Van Dike, to AMP Inc. Extraction tool. 220,377, 4–6–71, Cl. D8—14.

Boocock, Victor A. Motorcycle control lever dust shield. 220,417, 4–6–71, Cl. D90—1.

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Gamble, William L., to Scovil Mfg. Co. Electric scissors. 220,378, 4–6–71, Cl. D8—61.

Garelli, Patrick, and St. B. Alaska. Combination fish ruler, scaler, and compass. 220,395, 4–6–71, Cl. D22—31.

Geiger, Friedrich, and W. Carl, to Daimler-Benz Aktiengesellschaft, Automobile. 220,387, 4–6–71, Cl. D14—3.

Geltzer, Bernard. Orthodontic display model. 220,398, 4–6–71, Cl. D24—1.

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Kroninger, Luther H., Jr., G. W. Lehmann, and D. R. Straka, to Bristol-Myers Co. Vitamin tablet or similar article. 220,391, 4–6–71, Cl. D16—3.

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CLASSIFICATION OF PATENTS

ISSUED APRIL 6, 1971

NOTE.—First number, class; second number, subclass; third number, patent number

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